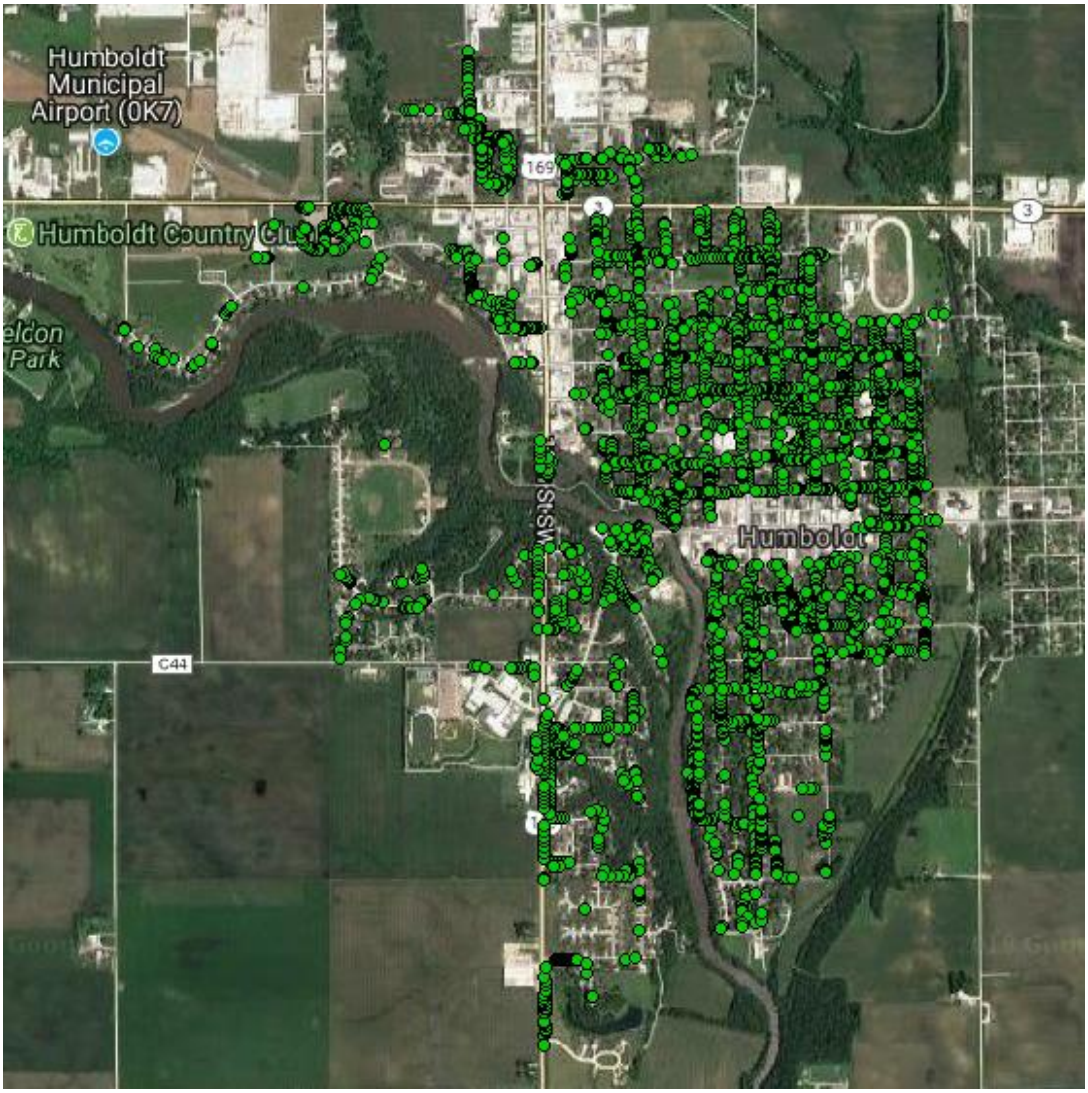
Community Tree Management Plan for Humboldt, IA



2017 Urban Forest Management Plan
Prepared by ArborPro, Inc.
In Partnership with the Iowa DNR

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Executive Summary

Overview

This plan was developed to assist the City of Humbolt with managing its urban forest, including budgeting and future planning. Trees can provide a multitude of benefits to the community, and sound management allows a community to best take advantage of these benefits. Management is especially important considering the serious threats posed by forest pests such as the emerald ash borer (EAB). EAB is an invasive insect imported from Eastern Asia on wood shipping crates that kills all species of ash trees (this does not include mountain ash). There is a strong possibility that 28% of Humbolt's community, unless preventative treatment is used, will become infested and 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 and Results

In 2017, a tree inventory was conducted using Global Positioning System (GPS) data collectors. The inventory was a complete inventory of street and park trees. Below are some key findings of the 3065 trees inventoried.

- Humbolt's trees provide $578,239.81 of benefits annually, an average of $192 a tree
- There are over 49 species of trees
- The top three genera are: Maple 37.52%, Ash 27.86%, and Honeylocust 4.17%
- 91% of trees need some type of management or mitigation.
- 210 trees are recommended for removal

Recommendations

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

- Of the 210 trees needing removal, 104 trees are over 24 inches in diameter at 4.5 ft and must be addressed immediately *City ownership of the trees recommended for removal should be verified prior to any removal*
- 351 of the 854 ash trees should be carefully examined, as they present with some of the symptoms that could be related to an EAB infestation.
- All trees should be pruned on a routine schedule- one third of the city every other year
- Plant a diverse mix of trees that do not include: Ash, Maple, Cottonwood, Poplar, Box Elder, Bradford Pear, female Ginko, Chinese Elm, Scot's Pine, Austrian Pine, Willow or Black Walnut.
- Check ash trees with a visual survey yearly
- With the current budget it could take 71 years to remove ash – Suggestion: request a budget increase to $20,000 annually and apply for grants to plant replacement trees

Introduction

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

Trees are an important component of Humbolt'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, storm water 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 Humbolt 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 Humbolt's urban forestry goals.

Inventory

In 2017, a tree inventory was conducted that included 100% of the city owned street trees and park trees. The tree data was collected using a hand held Global Positioning System (GPS) receiver. The data collector gives Geographic Information Systems (GIS) coordinates with an accuracy of 3 meters, which can be used in Arc GIS as an active GIS data layer. Because the inventory is a digital document the data can be updated with new information and become a working document.

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

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

Inventory Results

The data collected for the 3065 city trees was entered into the USDA Forest service program Street Tree Resource Analysis Tool for Urban Forestry Management (STRATUM), part of the i-Tree suite. The following are results from the i-Tree STRATUM analysis.

Annual Benefits

Annual Energy Benefits

Trees conserve energy by shading buildings and blocking winds. Humbolt's trees reduce energy related costs by approximately $155,382.74 annually (Appendix A, Table 1). These savings are both in Electricity (741 MWh) and in Natural Gas (101,141 Therms).

Annual Stormwater Benefits

Humbolt's trees intercept about 75,783,551 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides $205,373 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 Humbolt it is estimated that trees remove 1,151 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 $26,663 (Appendix A, Table 3).

Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Humbolt, trees sequester about 1,677,568 lbs of carbon a year with an associated value of $29,923 (Appendix A, Table 4). In addition, the trees store 25,767,170 lbs of carbon, with a yearly benefit of $193,254 (Appendix A, Table 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. Humbolt receives $169,898 in annual social benefits from trees (Appendix A, Table 6).

Financial Summary of all Benefits

According to the USDA Forest Service i-Tree STRATUM analysis, Humbolt's trees provide $578,240 of benefits annually. Benefits of individual trees vary based on size, species, health

and location, but on average each of the 3065 trees in Humbolt provide approximately $193 annually (Appendix A, Table 7).

Forest Structure

Species Distribution

Humbolt has over 44 different tree species along city streets and parks (Appendix A, Figure 1). The distribution of trees by genera is as follows:

Green ash	848	27.66
Silver maple	328	10.7
Northern hackberry	241	7.86
Sugar maple	211	6.88
Red maple	154	5.02
Black walnut	56	1.82
American basswood	49	1.59
Northern red oak	39	1.27
American elm	29	0.94
Pin oak	28	0.91
Bur oak	24	0.78
American sycamore	20	0.65
Black maple	19	0.61
Kentucky coffeetree	8	0.26
White ash	6	0.19
Eastern cottonwood	5	0.16
Paper birch	5	0.16
Catalpa	3	0.09
White oak	3	0.09
Cottonwood	2	0.06
Tulip tree	1	0.03
Elm	1	0.03
Norway maple	422	13.76
Honeylocust	128	4.17
Littleleaf linden	19	0.61
Siberian elm	13	0.42
Boxelder	9	0.29
Swamp white oak	6	0.19
Birch	4	0.13
Willow	4	0.13
Broadleaf Deciduous Medium	2	0.06
River birch	2	0.06
Ginkgo	2	0.06
Apple	106	3.45

White mulberry	16	0.52
Broadleaf Deciduous Small	14	0.45
Plum	10	0.32
Amur maple	8	0.26
Pear	7	0.22
Eastern redbud	3	0.09
Cherry plum	3	0.09
Black cherry	2	0.06
Spruce	19	0.61
Eastern white pine	13	0.42
Scotch pine	8	0.26
Conifer Evergreen Large	7	0.22
Norway spruce	7	0.22
Blue spruce	70	2.2
Eastern red cedar	22	0.71

Age Class

Approximately one half (45%) of Humbolt's trees are between 0 and 18 inches in diameter at 4.5 ft. (Appendix A, Figure 2). It is preferred that the highest number of trees are in the smallest size category (a downward slope) to prepare for natural mortality and to maintain canopy cover. Humbolt's size curve is on the downward side, indicating a young forest stand.

Condition: Wood and Foliage

Both wood condition and leaf condition are good indicators of the overall health of the urban forest. The foliage condition results for Humbolt indicate that 29% of the trees are in fair health, with 68% of the trees in good health, and only 2% of the foliage in poor health, dead or dying (Appendix A, Figure 3 & Appendix B, Figure 3). Similarly, 52% of Humbolt's trees are in fair health for wood condition, with 40% in good wood condition (Appendix A, Figure 4 & Appendix B, Figure 3). Wood condition that is in poor health, dead or dying is about 8% of the population. This 9% is an estimate of trees that need management follow up.

Management Needs

The following outlines the specific management needs of the street and park trees by number of trees and percent of canopy (Appendix B, Figure 3).

Priority Tasks for Public Trees by Zone (None)			
Total	80 (N/A)	2.66	2.66
Priority Tasks for Public Trees by Zone (Stake/Train)			
Total	182 (N/A)	6.05	6.05
Priority Tasks for Public Trees by Zone (Crown cleaning)			
Total	1760 (N/A)	58.55	58.55
Priority Tasks for Public Trees by Zone (Crown Raising)			
Total	363 (N/A)	12.08	12.08
Priority Tasks for Public Trees by Zone (Crown reduction/thinning)			
Total	410 (N/A)	13.64	13.64
Priority Tasks for Public Trees by Zone (Remove)			
Total	210 (N/A)	6.99	6.99
Priority Tasks for Public Trees by Zone (Treat pest/disease)			
Total	1 (N/A)	0.03	0.03

Canopy Cover

The total canopy with both private and public trees is 3%, 2970 acres. The canopy cover included in the Humbolt inventory includes approximately 83acres (Appendix A, Figure 4). The City's Canopy goal is 20%, in 30 years. To achieve this goal, it is estimated that 7-12 trees need to be planted annually.

Land Use and Location

The majority of Humbolt's city and park trees are in planting strips in single family residential neighborhoods (Appendix A, Figure 6 & Appendix A, Figure7). The following describes the land use and locations for the street and park trees.

Land Use			
Single family residential	2198 (N/A)	73.12	73.12
Multi-family residential	24 (N/A)	0.80	0.80
Small commercial	64 (N/A)	2.13	2.13
Industrial/Large commercial	34 (N/A)	1.13	1.13
Park/vacant/other	686 (N/A)	22.82	22.82

Location			
Front yard	1258 (N/A)	41.04	41.04
Planting strip	1123 (N/A)	36.63	36.63
Cutout	6 (N/A)	0.19	0.19
Median	29 (N/A)	0.94	0.94
Other maintained locations	642 (N/A)	20.94	20.94
Other un-maintained locations	7 (N/A)	0.22	0.22
Backyard	0 (N/A)	0.00	0.00

Recommendations

Risk Management

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

Hazardous trees

Humbolt has 15 critical concern trees that need immediate removal. These trees can be seen on the Location of Trees with Recommended Maintenance map (Appendix B, Figure 4). It is recommended to start with the large diameter critical concern trees first. There are 13 trees over 25 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 the critical concern trees are addressed, there should be follow up on the trees marked as needing maintenance. There is a total of 2665 trees with these needs.

Poor tree species

After the removal of the critical concern trees, ash trees in poor health should be assessed for removal (Appendix B, Figure 3 & Appendix B, Figure 4). Of the 210 removals, only 117 are ash trees. There is a total of 853 ash trees, and 350 of those have signs and symptoms that have been associated with EAB. In addition, there are 40 trees that are in poor health. *City ownership of the trees recommended for removal should be verified prior to any removal*

Pruning Cycle

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

Planting

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

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 (52.43%) (Appendix A, Figure 1). Maples should not be planted until this percentage can be lowered. Also, ash trees have not been recommended since 2002, due to the threat of EAB. Other species to avoid because they are public nuisances include: cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut. All trees planted must meet the restrictions in city ordinance.

Continual Monitoring

Due to the threat of EAB, it is important to continuously check the health of ash trees. It is recommended that ash trees be checked with a visual survey every year for tree decline and for the following signs and symptoms: canopy dieback, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage.

Six Year Maintenance Plan with <u>No Additional Funding:</u> This example will not adequately cover the 210 trees marked as needing removal.

Year 1

Removal: 8 largest critical concern trees
Planting and Replacement: 9 trees to be planted in open locations
Young Tree Pruning & Maintenance:
Visual Survey for signs and symptoms of EAB

Year 2

Removal: 2 critical concern trees and 4 additional ash trees with poor health
*Or saving for ash tree treatment and/or future ash removal
Planting and Replacement: 6 trees in open locations from year one removals
Young Tree Pruning & Maintenance:
Routine trimming: Contract to trim 1/3 of the city trees
Visual Survey for signs and symptoms of EAB

Year 3

Removal: 8 trees - removal of any new critical concern trees and ash in poor health
*Or saving for ash tree treatment and/or future ash removal
Planting and Replacement: 9 trees to be planted in open locations and locations from previous removals
Young Tree Pruning & Maintenance:
Visual Survey for signs and symptoms of EAB

Year 4

Removal: 6 trees - removal of any new critical concern trees and ash in poor health
*Or saving for ash tree treatment and/or future ash removal
Planting and Replacement: 7 trees in open locations from previous removals
Routine trimming: Contract to trim 1/3 of the city trees

Young Tree Pruning & Maintenance:
Visual Survey for signs and symptoms of EAB

Year 5

Removal: 8 trees - removal of any new critical concern trees and ash in poor health
*Or saving for ash tree treatment and/or future ash removal
Planting and Replacement: 9 trees to be planted in open locations and locations from previous removals
Young Tree Pruning & Maintenance:
Visual Survey for signs and symptoms of EAB

Year 6

Removal: 6 trees - removal of any new critical concern trees and ash in poor health
*Or saving for ash tree treatment and/or future ash removal
Planting and Replacement: 7 trees in open locations from previous removals
Routine trimming: Contract to trim 1/3 of the city trees
Young Tree Pruning & Maintenance:
Visual Survey for signs and symptoms of EAB

*Reduction of ash over 6 years: 24 ash trees removed (approximately 2.81% of ash). It will take approximately 10 years to remove all ash with the current budget. EAB could potentially kill all ash within 4 to 15 years of its arrival.
** To remove all ash trees within 6 years, the budget would need to be increased to $25,000 a year. If the budget were increased to $16,000 a year all ash could be removed in 13 years.

Emerald Ash Borer Plan

Ash Tree Removal

Tree removal will be prioritized with dead, dying, hazardous trees to be removed first (Appendix B, Figure 4). Next will be all ash in poor condition and displaying signs and symptoms of EAB (Appendix B, Figure 2 & Appendix B, Figure 3). *City ownership of the tree recommended for removal should be verified prior to any removal*

Treatment of Ash Trees

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

EAB Quarantines

EAB is an extremely destructive plant pest and it is responsible for the death and decline of millions of ash trees. Ash in both forested and urban settings constitute a significant portion of the canopy cover in the United States. Current tools to detect, control, suppress and eradicate this pest are not as robust as the USDA would desire. To stay ahead of this hard to detect

beetle, the USDA is attempting to contain the beetle before it spreads beyond its known positions by regulating articles.

A regulated article under the USDA's quarantine includes any of the following items:
• emerald ash borer
• firewood of all hardwood species (for example ash, oak, maple and hickory)
• nursery stock and green lumber of ash
• any other ash material, whether living, dead, cut or fallen, including logs, stumps, roots, branches, as well as composted and not composted chips of the genus ash (Mountain ash is not included)

In addition, any other article, product or means of conveyance not listed above may be designated as a regulated article if a USDA inspector determines that it presents a risk of spreading EAB once a quarantine is in effect for your county.

Wood Disposal

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

Canopy Replacement

As budget permits, all removed trees will be replaced. All trees will meet the restrictions in city ordinance (Appendix C). 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.

Postponed Work

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

Monitoring

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

Private Ash Trees

It is strongly recommended that private property owners start removing ash trees on their property upon arrival of EAB if tree is not being treated. An example of City Code could state "If it is determined with reasonable certainty that any such condition exists (trees or shrubs in the City reported or suspected to be infected with or damaged by any disease or insect or disease pests) on private property and that the danger to other trees or to adjoining property or passing motorists or pedestrians is imminent, the Council 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 14 days of receipt of notice, the Council may cause the condition to be corrected and the cost assessed against the property."

Budget

Current Budget
Total $57,000 over 6 years ($9500/year)

FY 2018 Budget
Removal: $8100
*Or saving for ash tree treatment and/or future ash removal
Planting: $1000
Watering & Maintenance: $500

FY 2019 Budget
Removal: $6000
*Or saving for ash tree treatment and/or future ash removal
Planting: $600
Routine trimming: $1,700
Watering & Maintenance: $500

FY 2020 Budget
Removal: $8100
*Or saving for ash tree treatment and/or future ash removal
Planting: $1000
Watering & Maintenance: $500

FY 2021 Budget
Removal: $6000
*Or saving for ash tree treatment and/or future ash removal
Planting: $600
Routine trimming: $1,700
Watering & Maintenance: $500

FY 2022 Budget
Removal: $8100
*Or saving for ash tree treatment and/or future ash removal
Planting: $1000
Watering & Maintenance: $500

FY 2023 Budget
Removal: $6000
*Or saving for ash tree treatment and/or future ash removal
Planting: $600
Routine trimming: $1,700
Watering & Maintenance: $500

*Reduction of ash over 6 years: approximately 24 ash trees removed (approximately 2.81% of ash). **It will take approximately 71 years to remove all ash with the current budget.**

Purposed Budget Increase
EAB could potentially kill all ash trees in Humbolt within 4 years of its arrival. To remove all ash trees within 6 years the budget would need to be increased to $25,000 a year. If the budget

were increased to $16,000 a year all ash could be removed within 13 years. Additionally, it is recommended that Humbolt apply for grants to fund replacement trees. Utility Company grants are usually between $500 and $10,000 for community-based, tree-planting projects that include parks, gateways, cemeteries, nature trails, libraries, nursing homes, and schools.

Another option being considered by many communities is treating a number of selected trees, either to maintain those trees in the landscape or to delay their removal – to spread out the costs and number of trees needing removed all at once. Trunk injection is administered every two years for the life of the tree. If treatment is discontinued, the tree dies. For instance, in this treatment scenario, the average ash diameter is 20 inches and at $15 per inch, about 4 trees could be treated per year (every other year treatment). This would be 8 trees selected for treatment, and *CITY* would still need to find $8,000 for removal. Alternatively, if there are 15 treatable trees, it would cost approximately $2,250 a year for treatment and leave $1,800 for removal. These are alternatives to straight removal of ash trees. However, whether or not the treatment option is selected, there will be an increased cost of dealing with ash trees if EAB is found in Humbolt. It is suggested to consider increasing the budget to plan for this.

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Appendix A: i-Tree Data

Table 1: Annual Energy Benefits

Humboldt

3/12/2018

Annual Energy Benefits of All Trees by Species

Species	Total Electricity (MWh)	Electricity ($)	Total Natural Gas (Therms)	Natural Gas ($)	Total ($)	Standard Error	% of Total Tree Numbers	% of Total $	Avg. $/tree
Green ash	221.46	16,808.91	30,021.87	29,421.43	46,230.34	(N/A)	28.21	29.75	54.52
Norway maple	96.83	7,349.55	13,658.61	13,385.44	20,734.99	(N/A)	14.04	13.34	49.14
Silver maple	106.12	8,054.39	14,029.04	13,748.46	21,802.85	(N/A)	10.91	14.03	66.47
Northern hackberry	83.14	6,310.69	11,758.95	11,523.77	17,834.46	(N/A)	8.02	11.48	74.00
Sugar maple	49.41	3,749.86	6,604.13	6,472.05	10,221.90	(N/A)	7.02	6.58	48.45
Red maple	25.50	1,935.33	3,360.60	3,293.39	5,228.72	(N/A)	5.12	3.37	33.95
Honeylocust	38.89	2,951.59	5,087.57	4,985.82	7,937.41	(N/A)	4.26	5.11	62.01
Apple	9.95	754.94	1,483.64	1,453.97	2,208.91	(N/A)	3.53	1.42	20.84
Blue spruce	6.91	524.58	937.98	919.22	1,443.80	(N/A)	2.33	0.93	20.63
Black walnut	16.04	1,217.39	2,207.46	2,163.31	3,380.70	(N/A)	1.86	2.18	60.37
American basswood	13.08	992.45	1,898.69	1,860.71	2,853.17	(N/A)	1.63	1.84	58.23
Northern red oak	5.01	380.29	695.22	681.32	1,061.61	(N/A)	1.30	0.68	27.22
American elm	10.85	823.54	1,394.05	1,366.17	2,189.71	(N/A)	0.96	1.41	75.51
Pin oak	7.78	590.35	1,048.06	1,027.10	1,617.46	(N/A)	0.93	1.04	57.77
Bur oak	6.53	495.77	904.84	886.75	1,382.51	(N/A)	0.80	0.89	57.60
Eastern red cedar	1.84	139.57	275.45	269.94	409.51	(N/A)	0.73	0.26	18.61
American sycamore	6.81	517.11	957.07	937.93	1,455.04	(N/A)	0.67	0.94	72.75
Spruce	1.20	91.36	171.46	168.03	259.40	(N/A)	0.63	0.17	13.65
Black maple	5.17	392.70	715.01	700.71	1,093.42	(N/A)	0.63	0.70	57.55
Littleleaf linden	3.15	239.01	404.84	396.74	635.75	(N/A)	0.63	0.41	33.46
White mulberry	2.33	176.50	356.36	349.23	525.73	(N/A)	0.53	0.34	32.86
Broadleaf Deciduous Small	0.87	66.35	138.23	135.46	201.81	(N/A)	0.47	0.13	14.42
Siberian elm	3.65	276.76	476.65	467.11	743.87	(N/A)	0.43	0.48	57.22
Eastern white pine	1.68	127.48	219.98	215.58	343.06	(N/A)	0.43	0.22	26.39
Plum	0.57	43.42	91.80	89.97	133.38	(N/A)	0.33	0.09	13.34
Boxelder	1.72	130.60	230.20	225.60	356.19	(N/A)	0.30	0.23	39.58
Kentucky coffeetree	1.44	109.28	192.57	188.72	298.01	(N/A)	0.27	0.19	37.25
Scotch pine	0.98	74.26	123.43	120.96	195.22	(N/A)	0.27	0.13	24.40
Amur maple	0.76	57.69	117.29	114.94	172.63	(N/A)	0.27	0.11	21.58
Norway spruce	1.07	80.96	142.89	140.04	221.00	(N/A)	0.23	0.14	31.57
Conifer Evergreen Large	0.83	63.15	107.20	105.06	168.21	(N/A)	0.23	0.11	24.03
Pear	0.78	58.98	113.12	110.86	169.84	(N/A)	0.23	0.11	24.26
Swamp white oak	0.36	27.13	49.51	48.52	75.66	(N/A)	0.20	0.05	12.61
White ash	0.85	64.23	100.98	98.96	163.19	(N/A)	0.20	0.11	27.20
Paper birch	1.30	98.29	165.94	162.62	260.92	(N/A)	0.17	0.17	52.18
Eastern cottonwood	2.02	153.12	263.17	257.91	411.03	(N/A)	0.17	0.26	82.21
Birch	0.12	9.08	19.36	18.97	28.06	(N/A)	0.13	0.02	7.01
Willow	1.07	81.07	159.10	155.92	236.99	(N/A)	0.13	0.15	59.25
Eastern redbud	0.41	30.79	60.09	58.88	89.67	(N/A)	0.10	0.06	29.89
White oak	0.28	21.55	41.18	40.36	61.91	(N/A)	0.10	0.04	20.64
Catalpa	0.76	57.72	103.21	101.15	158.87	(N/A)	0.10	0.10	52.96
Cherry plum	0.12	8.98	20.42	20.02	29.00	(N/A)	0.10	0.02	9.67
River birch	0.14	10.88	23.04	22.58	33.46	(N/A)	0.07	0.02	16.73
Broadleaf Deciduous Medi	0.04	3.24	6.98	6.84	10.09	(N/A)	0.07	0.01	5.04
Cottonwood	0.58	43.97	76.84	75.30	119.27	(N/A)	0.07	0.08	59.63
Ginkgo	0.21	16.01	29.48	28.89	44.90	(N/A)	0.07	0.03	22.45
Black cherry	0.38	29.11	56.29	55.16	84.27	(N/A)	0.07	0.05	42.14
Tulip tree	0.23	17.78	26.99	26.45	44.23	(N/A)	0.03	0.03	44.23
Elm	0.09	7.18	13.73	13.45	20.64	(N/A)	0.03	0.01	20.64
Total	741.30	56,264.99	101,140.57	99,117.76	155,382.75	(N/A)	100.00	100.00	51.69

Table 2: Annual Storm Water Benefits

Humboldt

3/12/2018

Annual Stormwater Benefits of All Trees by Species

Species	Total Rainfall Interception (Gal)	Total ($)	Standard Error	% of Total Tree Numbers	% of Total $	Avg. $/tree
Green ash	2,301,382.50	62,367.47	(N/A)	28.21	30.37	73.55
Norway maple	793,001.32	21,490.34	(N/A)	14.04	10.46	50.92
Silver maple	1,436,167.01	38,920.13	(N/A)	10.91	18.95	118.66
Northern hackberry	819,710.60	22,214.16	(N/A)	8.02	10.82	92.17
Sugar maple	447,765.63	12,134.45	(N/A)	7.02	5.91	57.51
Red maple	188,053.43	5,096.25	(N/A)	5.12	2.48	33.09
Honeylocust	409,704.04	11,102.98	(N/A)	4.26	5.41	86.74
Apple	39,209.63	1,062.58	(N/A)	3.53	0.52	10.02
Blue spruce	90,213.90	2,444.80	(N/A)	2.33	1.19	34.93
Black walnut	166,587.02	4,514.51	(N/A)	1.86	2.20	80.62
American basswood	137,467.80	3,725.38	(N/A)	1.63	1.81	76.03
Northern red oak	45,806.80	1,241.36	(N/A)	1.30	0.60	31.83
American elm	95,108.90	2,577.45	(N/A)	0.96	1.26	88.88
Pin oak	73,333.35	1,987.33	(N/A)	0.93	0.97	70.98
Bur oak	75,556.99	2,047.59	(N/A)	0.80	1.00	85.32
Eastern red cedar	26,570.93	720.07	(N/A)	0.73	0.35	32.73
American sycamore	88,175.91	2,389.57	(N/A)	0.67	1.16	119.48
Spruce	17,082.18	462.93	(N/A)	0.63	0.23	24.36
Black maple	49,704.71	1,347.00	(N/A)	0.63	0.66	70.89
Littleleaf linden	23,373.02	633.41	(N/A)	0.63	0.31	33.34
White mulberry	11,101.43	300.85	(N/A)	0.53	0.15	18.80
Broadleaf Deciduous Small	3,977.88	107.80	(N/A)	0.47	0.05	7.70
Siberian elm	37,610.04	1,019.23	(N/A)	0.43	0.50	78.40
Eastern white pine	30,813.10	835.04	(N/A)	0.43	0.41	64.23
Plum	2,006.57	54.38	(N/A)	0.33	0.03	5.44
Boxelder	15,596.96	422.68	(N/A)	0.30	0.21	46.96
Kentucky coffeetree	12,812.21	347.21	(N/A)	0.27	0.17	43.40
Scotch pine	16,541.34	448.27	(N/A)	0.27	0.22	56.03
Amur maple	2,724.17	73.82	(N/A)	0.27	0.04	9.23
Norway spruce	22,419.78	607.58	(N/A)	0.23	0.30	86.80
Conifer Evergreen Large	13,380.74	362.62	(N/A)	0.23	0.18	51.80
Pear	2,800.51	75.89	(N/A)	0.23	0.04	10.84
Swamp white oak	2,043.87	55.39	(N/A)	0.20	0.03	9.23
White ash	5,329.38	144.43	(N/A)	0.20	0.07	24.07
Paper birch	10,930.28	296.21	(N/A)	0.17	0.14	59.24
Eastern cottonwood	27,125.26	735.09	(N/A)	0.17	0.36	147.02
Birch	500.32	13.56	(N/A)	0.13	0.01	3.39
Willow	11,879.00	321.92	(N/A)	0.13	0.16	80.48
Eastern redbud	1,909.22	51.74	(N/A)	0.10	0.03	17.25
White oak	1,823.58	49.42	(N/A)	0.10	0.02	16.47
Catalpa	6,646.91	180.13	(N/A)	0.10	0.09	60.04
Cherry plum	401.81	10.89	(N/A)	0.10	0.01	3.63
River birch	748.66	20.29	(N/A)	0.07	0.01	10.14
Broadleaf Deciduous Medi	174.91	4.74	(N/A)	0.07	0.00	2.37
Cottonwood	7,846.78	212.65	(N/A)	0.07	0.10	106.32
Ginkgo	1,321.44	35.81	(N/A)	0.07	0.02	17.91
Black cherry	1,840.57	49.88	(N/A)	0.07	0.02	24.94
Tulip tree	1,465.55	39.72	(N/A)	0.03	0.02	39.72
Elm	607.86	16.47	(N/A)	0.03	0.01	16.47
Citywide total	7,578,355.80	205,373.44	(N/A)	100.00	100.00	68.32

Table 3: Annual Air Quality Benefits

Humboldt

3/12/2018

Annual Air Quality Benefits of All Trees by Species

Species	Deposition O3 (lb)	Deposition NO2 (lb)	Deposition PM10 (lb)	Deposition SO2 (lb)	Total Deposition ($)	Avoided NO2 (lb)	Avoided PM10 (lb)	Avoided VOC (lb)	Avoided SO2 (lb)	Total Avoided ($)	BVOC Emissions (lb)	BVOC Emissions ($)	Total (lb)	Total ($)	Standard Error	% of Total Tree Numbers	Avg. $/tree
Green ash	269.95	43.18	131.79	12.11	1,445.06	1,054.78	153.77	146.65	1,003.76	6,577.35	0.00	0.00	2,815.98	8,022.41	(N/A)	28.21	9.46
Norway maple	149.20	25.74	74.95	6.61	810.76	466.82	67.68	64.46	439.40	2,898.28	- 36.07	- 135.25	1,258.79	3,573.79	(N/A)	14.04	8.47
Silver maple	236.98	40.18	117.74	10.50	1,281.73	500.86	73.28	69.95	480.11	3,132.36	- 124.58	- 467.16	1,405.04	3,946.92	(N/A)	10.91	12.03
Northern hackberry	132.41	22.91	66.91	5.93	720.99	401.00	58.11	55.34	377.09	2,488.72	0.00	0.00	1,119.70	3,209.71	(N/A)	8.02	13.32
Sugar maple	52.62	8.95	27.88	2.33	289.63	234.21	34.22	32.65	223.81	1,462.90	- 42.57	- 159.62	574.10	1,592.91	(N/A)	7.02	7.55
Red maple	40.72	6.94	19.51	1.80	218.32	120.43	17.63	16.83	115.52	753.37	- 14.24	- 53.38	325.14	918.30	(N/A)	5.12	5.96
Honeylocust	79.22	13.06	36.26	3.61	418.61	183.17	26.84	25.62	176.03	1,146.70	- 60.78	- 227.93	483.02	1,337.39	(N/A)	4.26	10.45
Apple	11.19	1.84	5.40	0.51	59.93	48.57	6.99	6.65	45.08	299.88	- 0.06	- 0.23	126.18	359.58	(N/A)	3.53	3.39
Blue spruce	11.42	2.26	9.77	1.40	76.32	32.83	4.79	4.57	31.29	204.83	- 31.89	- 119.60	66.43	161.54	(N/A)	2.33	2.31
Black walnut	19.15	3.06	9.40	0.86	102.64	76.69	11.16	10.64	72.70	477.49	0.00	0.00	203.66	580.13	(N/A)	1.86	10.36
American basswood	17.89	3.05	8.95	0.79	96.99	63.52	9.17	8.73	59.33	393.16	- 15.51	- 58.15	155.93	432.00	(N/A)	1.63	8.82
Northern red oak	9.29	1.60	4.59	0.41	50.26	23.97	3.49	3.32	22.70	149.17	- 13.25	- 49.70	56.11	149.73	(N/A)	1.30	3.84
American elm	25.45	4.34	12.13	1.13	136.26	51.02	7.49	7.15	49.17	319.77	0.00	0.00	157.87	456.03	(N/A)	0.96	15.73
Pin oak	11.55	2.02	6.14	0.52	63.83	36.95	5.39	5.14	35.23	230.58	- 22.07	- 82.77	80.87	211.65	(N/A)	0.93	7.56
Bur oak	9.50	1.52	4.51	0.43	50.49	31.28	4.55	4.33	29.60	194.63	0.00	0.00	85.72	245.12	(N/A)	0.80	10.21
Eastern red cedar	5.13	1.02	4.10	0.63	33.50	8.96	1.29	1.23	8.32	55.34	- 14.58	- 54.68	16.11	34.16	(N/A)	0.73	1.55
American sycamore	11.93	1.91	5.52	0.53	63.00	32.75	4.75	4.53	30.88	203.46	0.00	0.00	92.80	266.47	(N/A)	0.67	13.32
Spruce	1.74	0.35	1.55	0.21	11.83	5.79	0.84	0.80	5.45	35.97	- 7.22	- 27.07	9.52	20.73	(N/A)	0.63	1.09
Black maple	12.71	2.17	5.84	0.56	67.43	24.73	3.60	3.43	23.43	153.94	- 4.16	- 15.58	72.31	205.79	(N/A)	0.63	10.83
Littleleaf linden	3.35	0.58	1.76	0.15	18.42	14.83	2.18	2.08	14.30	92.97	- 1.74	- 6.52	37.48	104.86	(N/A)	0.63	5.52
White mulberry	3.66	0.60	1.70	0.17	19.42	11.43	1.64	1.56	10.54	70.40	- 0.02	- 0.07	31.28	89.74	(N/A)	0.53	5.61
Broadleaf Deciduous Small	1.19	0.20	0.57	0.05	6.35	4.33	0.62	0.59	3.96	26.59	- 0.01	- 0.02	11.50	32.92	(N/A)	0.47	2.35
Siberian elm	6.36	1.08	3.11	0.28	34.26	17.20	2.52	2.40	16.52	107.63	0.00	0.00	49.47	141.89	(N/A)	0.43	10.91
Eastern white pine	3.55	0.70	2.91	0.44	23.38	7.91	1.16	1.11	7.61	49.53	- 14.36	- 53.86	11.02	19.04	(N/A)	0.43	1.46
Plum	0.41	0.07	0.22	0.02	2.24	2.85	0.41	0.39	2.59	17.45	0.00	- 0.01	6.94	19.69	(N/A)	0.33	1.97
Boxelder	1.80	0.29	0.89	0.08	9.66	8.15	1.19	1.14	7.79	50.93	- 0.80	- 3.02	20.53	57.58	(N/A)	0.30	6.40
Kentucky coffeetree	1.28	0.21	0.67	0.06	6.98	6.83	1.00	0.95	6.53	42.66	0.00	0.00	17.52	49.64	(N/A)	0.27	6.21
Scotch pine	1.89	0.37	1.56	0.23	12.46	4.56	0.67	0.64	4.43	28.69	- 7.16	- 26.86	7.20	14.29	(N/A)	0.27	1.79
Amur maple	0.65	0.11	0.33	0.03	3.51	3.75	0.54	0.51	3.45	23.05	0.00	- 0.01	9.35	26.55	(N/A)	0.27	3.32
Norway spruce	2.64	0.52	2.13	0.32	17.27	5.05	0.74	0.70	4.83	31.56	- 11.13	- 41.72	5.81	7.10	(N/A)	0.23	1.01
Conifer Evergreen Large	1.52	0.30	1.27	0.19	10.10	3.90	0.57	0.55	3.77	24.48	- 6.21	- 23.29	5.87	11.28	(N/A)	0.23	1.61
Pear	0.76	0.12	0.37	0.03	4.08	3.77	0.54	0.52	3.52	23.35	0.00	- 0.01	9.64	27.41	(N/A)	0.23	3.92
Swamp white oak	0.28	0.05	0.16	0.01	1.55	1.72	0.25	0.24	1.62	10.67	- 0.08	- 0.29	4.24	11.93	(N/A)	0.20	1.99
White ash	0.28	0.05	0.20	0.01	1.69	3.90	0.58	0.55	3.83	24.65	0.00	0.00	9.41	26.34	(N/A)	0.20	4.39
Paper birch	1.09	0.17	0.57	0.05	5.93	6.08	0.89	0.85	5.87	38.15	0.00	0.00	15.58	44.08	(N/A)	0.17	8.82
Eastern cottonwood	5.36	0.86	2.36	0.24	27.97	9.52	1.39	1.33	9.14	59.57	0.00	0.00	30.21	87.54	(N/A)	0.17	17.51
Birch	0.02	0.00	0.02	0.00	0.15	0.60	0.09	0.08	0.54	3.67	- 0.01	- 0.04	1.35	3.77	(N/A)	0.13	0.94
Willow	2.65	0.46	1.28	0.12	14.23	5.22	0.75	0.71	4.85	32.24	- 0.60	- 2.26	15.43	44.21	(N/A)	0.13	11.05
Eastern redbud	0.65	0.11	0.30	0.03	3.41	1.98	0.28	0.27	1.84	12.21	0.00	- 0.01	5.44	15.61	(N/A)	0.10	5.20
White oak	0.07	0.01	0.06	0.00	0.47	1.37	0.20	0.19	1.29	8.51	0.00	0.00	3.20	8.98	(N/A)	0.10	2.99
Catalpa	0.64	0.10	0.34	0.03	3.51	3.62	0.53	0.50	3.45	22.59	0.00	0.00	9.22	26.10	(N/A)	0.10	8.70
Cherry plum	0.05	0.01	0.03	0.00	0.31	0.60	0.08	0.08	0.54	3.66	0.00	0.00	1.40	3.97	(N/A)	0.10	1.32
River birch	0.06	0.01	0.05	0.00	0.38	0.72	0.10	0.10	0.65	4.39	- 0.02	- 0.09	1.66	4.68	(N/A)	0.07	2.34
Broadleaf Deciduous Medi	0.01	0.00	0.01	0.00	0.05	0.21	0.03	0.03	0.19	1.31	0.00	- 0.01	0.48	1.35	(N/A)	0.07	0.67
Cottonwood	1.61	0.26	0.71	0.07	8.40	2.74	0.40	0.38	2.62	17.14	0.00	0.00	8.80	25.54	(N/A)	0.07	12.77
Ginkgo	0.30	0.05	0.15	0.01	1.65	1.01	0.15	0.14	0.96	6.28	- 0.10	- 0.37	2.67	7.56	(N/A)	0.07	3.78
Black cherry	0.64	0.11	0.29	0.03	3.39	1.86	0.27	0.26	1.74	11.53	0.00	- 0.01	5.19	14.90	(N/A)	0.07	7.45
Tulip tree	0.11	0.02	0.07	0.00	0.62	1.07	0.16	0.15	1.06	6.80	0.00	0.00	2.65	7.42	(N/A)	0.03	7.42
Elm	0.02	0.00	0.02	0.00	0.16	0.46	0.07	0.06	0.43	2.84	0.00	0.00	1.07	2.99	(N/A)	0.03	2.99
Citywide Total	1,150.95	193.51	577.03	53.56	6,239.57	3,535.59	515.03	491.09	3,359.36	22,033.43	- 429.23	- 1,609.63	9,446.88	26,663.37	(N/A)	100.00	8.87

Table 4: Annual Carbon Stored

Humboldt

3/12/2018

Stored CO2 Benefits of All Trees by Species

Species	Total stored CO2 (lbs)	Total ($)	Standard Error	% of Total Tree Numbers	% of Total $	Avg. $/tree
Green ash	8,794,729.57	65,960.47	(N/A)	28.21	34.13	77.78
Norway maple	2,454,181.51	18,406.36	(N/A)	14.04	9.52	43.62
Silver maple	5,236,111.17	39,270.83	(N/A)	10.91	20.32	119.73
Northern hackberry	2,016,004.71	15,120.04	(N/A)	8.02	7.82	62.74
Sugar maple	1,487,426.59	11,155.70	(N/A)	7.02	5.77	52.87
Red maple	455,491.06	3,416.18	(N/A)	5.12	1.77	22.18
Honeylocust	1,013,611.83	7,602.09	(N/A)	4.26	3.93	59.39
Apple	177,319.72	1,329.90	(N/A)	3.53	0.69	12.55
Blue spruce	73,045.26	547.84	(N/A)	2.33	0.28	7.83
Black walnut	615,882.79	4,619.12	(N/A)	1.86	2.39	82.48
American basswood	653,584.69	4,901.89	(N/A)	1.63	2.54	100.04
Northern red oak	195,867.70	1,469.01	(N/A)	1.30	0.76	37.67
American elm	514,454.50	3,858.41	(N/A)	0.96	2.00	133.05
Pin oak	290,939.39	2,182.05	(N/A)	0.93	1.13	77.93
Bur oak	309,011.06	2,317.58	(N/A)	0.80	1.20	96.57
Eastern red cedar	16,903.07	126.77	(N/A)	0.73	0.07	5.76
American sycamore	390,018.68	2,925.14	(N/A)	0.67	1.51	146.26
Spruce	15,970.78	119.78	(N/A)	0.63	0.06	6.30
Black maple	135,473.57	1,016.05	(N/A)	0.63	0.53	53.48
Littleleaf linden	74,494.67	558.71	(N/A)	0.63	0.29	29.41
White mulberry	57,322.24	429.92	(N/A)	0.53	0.22	26.87
Broadleaf Deciduous Small	19,446.50	145.85	(N/A)	0.47	0.08	10.42
Siberian elm	157,569.66	1,181.77	(N/A)	0.43	0.61	90.91
Eastern white pine	34,695.09	260.21	(N/A)	0.43	0.13	20.02
Plum	7,393.73	55.45	(N/A)	0.33	0.03	5.55
Boxelder	51,189.82	383.92	(N/A)	0.30	0.20	42.66
Kentucky coffeetree	42,178.24	316.34	(N/A)	0.27	0.16	39.54
Scotch pine	16,884.15	126.63	(N/A)	0.27	0.07	15.83
Amur maple	10,791.64	80.94	(N/A)	0.27	0.04	10.12
Norway spruce	27,546.77	206.60	(N/A)	0.23	0.11	29.51
Conifer Evergreen Large	14,857.12	111.43	(N/A)	0.23	0.06	15.92
Pear	11,848.98	88.87	(N/A)	0.23	0.05	12.70
Swamp white oak	4,792.18	35.94	(N/A)	0.20	0.02	5.99
White ash	10,632.71	79.75	(N/A)	0.20	0.04	13.29
Paper birch	35,245.94	264.34	(N/A)	0.17	0.14	52.87
Eastern cottonwood	187,390.55	1,405.43	(N/A)	0.17	0.73	281.09
Birch	672.24	5.04	(N/A)	0.13	0.00	1.26
Willow	43,941.11	329.56	(N/A)	0.13	0.17	82.39
Eastern redbud	9,957.66	74.68	(N/A)	0.10	0.04	24.89
White oak	3,103.59	23.28	(N/A)	0.10	0.01	7.76
Catalpa	20,587.20	154.40	(N/A)	0.10	0.08	51.47
Cherry plum	1,263.49	9.48	(N/A)	0.10	0.00	3.16
River birch	1,319.13	9.89	(N/A)	0.07	0.01	4.95
Broadleaf Deciduous Medi	235.30	1.76	(N/A)	0.07	0.00	0.88
Cottonwood	57,016.51	427.62	(N/A)	0.07	0.22	213.81
Ginkgo	4,280.27	32.10	(N/A)	0.07	0.02	16.05
Black cherry	9,779.87	73.35	(N/A)	0.07	0.04	36.67
Tulip tree	3,671.83	27.54	(N/A)	0.03	0.01	27.54
Elm	1,034.53	7.76	(N/A)	0.03	0.00	7.76
Citywide total	25,767,170.40	193,253.78	(N/A)	100.00	100.00	64.29

Table 5: Annual Carbon Sequestered

Humboldt

3/12/2018

Annual CO2 Benefits of All Trees by Species

Species	Sequestered (lb)	Sequestered ($)	Decomposition Release(lb)	Maintenance Release (lb)	Total Release ($)	Avoided (lb)	Avoided ($)	Net Total (lb)	Total ($)	Standard Error	% of Total Tree Numbers	% of Total $	Avg. $/tree
Green ash	519,211.69	3,894.09	- 42,215.13	- 2,266.31	- 333.61	371,472.33	2,786.04	846,202.58	6,346.52	(N/A)	28.21	30.33	7.48
Norway maple	158,956.56	1,192.17	- 11,786.58	- 945.56	- 95.49	162,423.06	1,218.17	308,647.48	2,314.86	(N/A)	14.04	11.06	5.49
Silver maple	414,849.70	3,111.37	- 25,133.39	- 1,135.50	- 197.02	177,999.88	1,335.00	566,580.69	4,249.36	(N/A)	10.91	20.31	12.96
Northern hackberry	106,378.74	797.84	- 9,677.37	- 787.22	- 78.48	139,464.67	1,045.99	235,378.82	1,765.34	(N/A)	8.02	8.44	7.33
Sugar maple	95,056.01	712.92	- 7,141.58	- 502.71	- 57.33	82,870.80	621.53	170,282.51	1,277.12	(N/A)	7.02	6.10	6.05
Red maple	45,499.40	341.25	- 2,187.11	- 234.59	- 18.16	42,770.37	320.78	85,848.08	643.86	(N/A)	5.12	3.08	4.18
Honeylocust	100,289.03	752.17	- 4,866.65	- 303.81	- 38.78	65,229.29	489.22	160,347.85	1,202.61	(N/A)	4.26	5.75	9.40
Apple	15,394.91	115.46	- 851.80	- 133.97	- 7.39	16,684.03	125.13	31,093.17	233.20	(N/A)	3.53	1.11	2.20
Blue spruce	5,239.90	39.30	- 350.62	- 119.34	- 3.52	11,593.09	86.95	16,363.03	122.72	(N/A)	2.33	0.59	1.75
Black walnut	38,810.51	291.08	- 2,956.24	- 163.02	- 23.39	26,904.03	201.78	62,595.28	469.46	(N/A)	1.86	2.24	8.38
American basswood	39,816.25	298.62	- 3,137.29	- 150.54	- 24.66	21,932.93	164.50	58,461.35	438.46	(N/A)	1.63	2.10	8.95
Northern red oak	6,404.36	48.03	- 940.61	- 64.35	- 7.54	8,404.40	63.03	13,803.80	103.53	(N/A)	1.30	0.49	2.65
American elm	13,046.19	97.85	- 2,470.52	- 104.52	- 19.31	18,200.11	136.50	28,671.25	215.03	(N/A)	0.96	1.03	7.41
Pin oak	29,183.04	218.87	- 1,396.51	- 78.20	- 11.06	13,046.63	97.85	40,754.96	305.66	(N/A)	0.93	1.46	10.92
Bur oak	15,877.43	119.08	- 1,483.29	- 69.42	- 11.65	10,956.32	82.17	25,281.03	189.61	(N/A)	0.80	0.91	7.90
Eastern red cedar	612.27	4.59	- 81.14	- 34.52	- 0.87	3,084.41	23.13	3,581.02	26.86	(N/A)	0.73	0.13	1.22
American sycamore	16,728.16	125.46	- 1,872.09	- 74.10	- 14.60	11,428.09	85.71	26,210.06	196.58	(N/A)	0.67	0.94	9.83
Spruce	959.12	7.19	- 76.66	- 24.77	- 0.76	2,019.11	15.14	2,876.80	21.58	(N/A)	0.63	0.10	1.14
Black maple	3,901.71	29.26	- 650.27	- 48.75	- 5.24	8,678.67	65.09	11,881.35	89.11	(N/A)	0.63	0.43	4.69
Littleleaf linden	8,905.51	66.79	- 358.77	- 34.32	- 2.95	5,282.15	39.62	13,794.57	103.46	(N/A)	0.63	0.49	5.45
White mulberry	4,070.13	30.53	- 275.15	- 31.40	- 2.30	3,900.57	29.25	7,664.16	57.48	(N/A)	0.53	0.27	3.59
Broadleaf Deciduous Small	749.07	5.62	- 93.48	- 15.41	- 0.82	1,466.33	11.00	2,106.52	15.80	(N/A)	0.47	0.08	1.13
Siberian elm	6,592.77	49.45	- 756.33	- 38.61	- 5.96	6,116.27	45.87	11,914.09	89.36	(N/A)	0.43	0.43	6.87
Eastern white pine	1,984.95	14.89	- 166.54	- 30.23	- 1.48	2,817.34	21.13	4,605.53	34.54	(N/A)	0.43	0.17	2.66
Plum	883.58	6.63	- 35.53	- 9.17	- 0.34	959.48	7.20	1,798.35	13.49	(N/A)	0.33	0.06	1.35
Boxelder	4,737.79	35.53	- 245.71	- 19.89	- 1.99	2,886.12	21.65	7,358.31	55.19	(N/A)	0.30	0.26	6.13
Kentucky coffeetree	3,304.99	24.79	- 202.46	- 15.02	- 1.63	2,415.15	18.11	5,502.67	41.27	(N/A)	0.27	0.20	5.16
Scotch pine	1,099.68	8.25	- 81.05	- 16.97	- 0.74	1,641.09	12.31	2,642.76	19.82	(N/A)	0.27	0.09	2.48
Amur maple	1,142.59	8.57	- 51.80	- 10.34	- 0.47	1,274.94	9.56	2,355.39	17.67	(N/A)	0.27	0.08	2.21
Norway spruce	1,380.31	10.35	- 132.22	- 19.89	- 1.14	1,789.26	13.42	3,017.46	22.63	(N/A)	0.23	0.11	3.23
Conifer Evergreen Large	895.32	6.71	- 71.31	- 14.43	- 0.64	1,395.64	10.47	2,205.21	16.54	(N/A)	0.23	0.08	2.36
Pear	1,153.22	8.65	- 56.92	- 9.56	- 0.50	1,303.54	9.78	2,390.29	17.93	(N/A)	0.23	0.09	2.56
Swamp white oak	631.57	4.74	- 23.22	- 3.90	- 0.20	599.63	4.50	1,204.08	9.03	(N/A)	0.20	0.04	1.51
White ash	1,598.93	11.99	- 51.63	- 8.00	- 0.45	1,419.44	10.65	2,958.75	22.19	(N/A)	0.20	0.11	3.70
Paper birch	2,852.57	21.39	- 169.18	- 12.09	- 1.36	2,172.25	16.29	4,843.56	36.33	(N/A)	0.17	0.17	7.27
Eastern cottonwood	2,738.81	20.54	- 899.47	- 23.01	- 6.92	3,383.95	25.38	5,200.27	39.00	(N/A)	0.17	0.19	7.80
Birch	292.26	2.19	- 5.38	- 1.95	- 0.05	200.75	1.51	485.69	3.64	(N/A)	0.13	0.02	0.91
Willow	223.95	1.68	- 210.92	- 14.04	- 1.69	1,791.62	13.44	1,790.61	13.43	(N/A)	0.13	0.06	3.36
Eastern redbud	784.03	5.88	- 47.80	- 5.27	- 0.40	680.46	5.10	1,411.43	10.59	(N/A)	0.10	0.05	3.53
White oak	626.39	4.70	- 14.90	- 3.51	- 0.14	476.25	3.57	1,084.23	8.13	(N/A)	0.10	0.04	2.71
Catalpa	1,764.72	13.24	- 98.82	- 7.41	- 0.80	1,275.64	9.57	2,934.13	22.01	(N/A)	0.10	0.11	7.34
Cherry plum	189.75	1.42	- 6.06	- 2.34	- 0.06	198.53	1.49	379.88	2.85	(N/A)	0.10	0.01	0.95
River birch	319.56	2.40	- 7.03	- 1.76	- 0.07	240.38	1.80	551.15	4.13	(N/A)	0.07	0.02	2.07
Broadleaf Deciduous Medi	101.03	0.76	- 1.88	- 0.78	- 0.02	71.71	0.54	170.08	1.28	(N/A)	0.07	0.01	0.64
Cottonwood	687.66	5.16	- 273.68	- 7.02	- 2.11	971.69	7.29	1,378.65	10.34	(N/A)	0.07	0.05	5.17
Ginkgo	241.69	1.81	- 20.55	- 3.32	- 0.18	353.92	2.65	571.75	4.29	(N/A)	0.07	0.02	2.14
Black cherry	746.09	5.60	- 46.94	- 4.68	- 0.39	643.27	4.82	1,337.73	10.03	(N/A)	0.07	0.05	5.02
Tulip tree	445.34	3.34	- 17.62	- 1.95	- 0.15	392.87	2.95	818.63	6.14	(N/A)	0.03	0.03	6.14
Elm	208.80	1.57	- 4.97	- 1.17	- 0.05	158.75	1.19	361.41	2.71	(N/A)	0.03	0.01	2.71
Citywide Total	1,677,568.04	12,581.76	- 123,702.17	- 7,608.58	- 984.83	1,243,441.18	9,325.81	2,789,698.47	20,922.74	(N/A)	100.00	100.00	6.96

Table 6: Annual Social and Aesthetic Benefits

Humboldt

3/12/2018

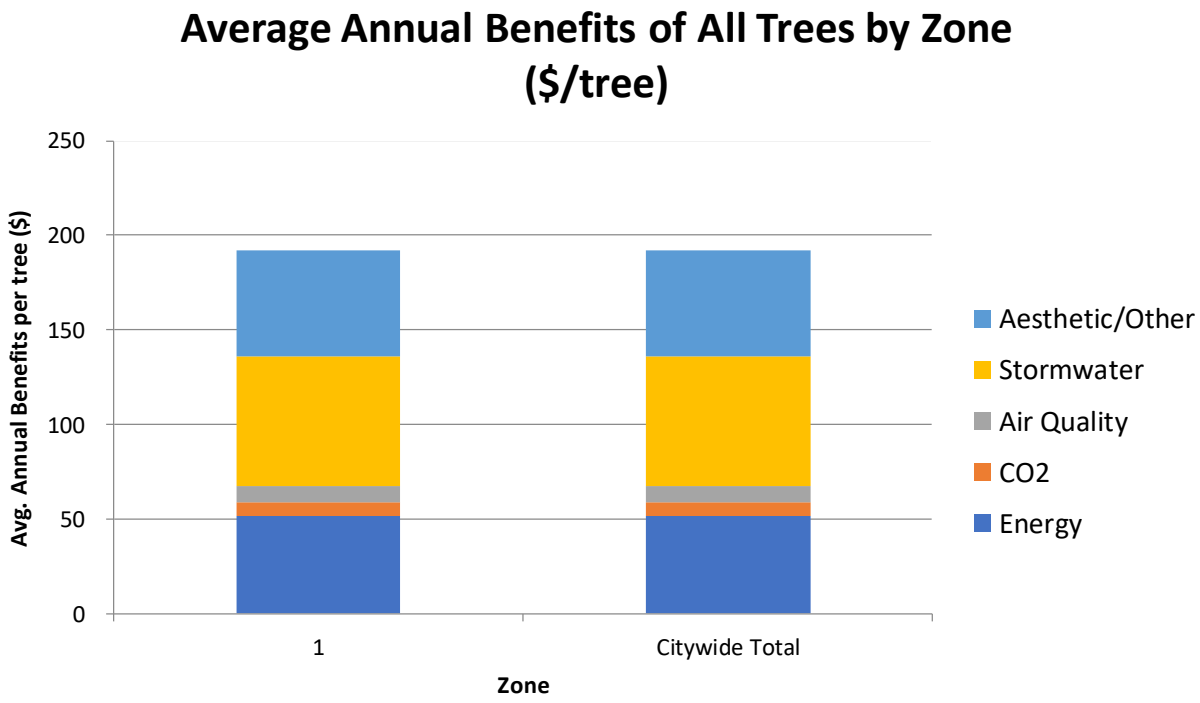
Average Annual Benefits of All Tree by Species ($/tree)

Species	Energy	CO2	Air Quality	Stormwater	Aesthetic/Other	Total	Standard Error
Green ash	54.52	7.48	9.46	73.55	52.40	197.41	(N/A)
Norway maple	49.14	5.49	8.47	50.92	36.61	150.62	(N/A)
Silver maple	66.47	12.96	12.03	118.66	100.97	311.09	(N/A)
Northern hackberry	74.00	7.33	13.32	92.17	57.83	244.65	(N/A)
Sugar maple	48.45	6.05	7.55	57.51	50.22	169.78	(N/A)
Red maple	33.95	4.18	5.96	33.09	40.51	117.70	(N/A)
Honeylocust	62.01	9.40	10.45	86.74	187.14	355.74	(N/A)
Apple	20.84	2.20	3.39	10.02	8.32	44.77	(N/A)
Blue spruce	20.63	1.75	2.31	34.93	21.83	81.45	(N/A)
Black walnut	60.37	8.38	10.36	80.62	57.99	217.72	(N/A)
American basswood	58.23	8.95	8.82	76.03	59.67	211.69	(N/A)
Northern red oak	27.22	2.65	3.84	31.83	13.48	79.02	(N/A)
American elm	75.51	7.41	15.73	88.88	59.72	247.25	(N/A)
Pin oak	57.77	10.92	7.56	70.98	87.21	234.43	(N/A)
Bur oak	57.60	7.90	10.21	85.32	53.62	214.66	(N/A)
Eastern red cedar	18.61	1.22	1.55	32.73	11.86	65.98	(N/A)
American sycamore	72.75	9.83	13.32	119.48	62.73	278.11	(N/A)
Spruce	13.65	1.14	1.09	24.36	14.88	55.12	(N/A)
Black maple	57.55	4.69	10.83	70.89	25.73	169.69	(N/A)
Littleleaf linden	33.46	5.45	5.52	33.34	50.73	128.49	(N/A)
White mulberry	32.86	3.59	5.61	18.80	15.00	75.86	(N/A)
Broadleaf Deciduous Small	14.42	1.13	2.35	7.70	2.91	28.51	(N/A)
Siberian elm	57.22	6.87	10.91	78.40	38.37	191.78	(N/A)
Eastern white pine	26.39	2.66	1.46	64.23	36.54	131.29	(N/A)
Plum	13.34	1.35	1.97	5.44	4.94	27.03	(N/A)
Boxelder	39.58	6.13	6.40	46.96	43.62	142.69	(N/A)
Kentucky coffeetree	37.25	5.16	6.21	43.40	40.41	132.43	(N/A)
Scotch pine	24.40	2.48	1.79	56.03	36.38	121.08	(N/A)
Amur maple	21.58	2.21	3.32	9.23	8.13	44.46	(N/A)
Norway spruce	31.57	3.23	1.01	86.80	44.11	166.72	(N/A)
Conifer Evergreen Large	24.03	2.36	1.61	51.80	28.73	108.54	(N/A)
Pear	24.26	2.56	3.92	10.84	9.38	50.97	(N/A)
Swamp white oak	12.61	1.51	1.99	9.23	12.72	38.06	(N/A)
White ash	27.20	3.70	4.39	24.07	40.08	99.44	(N/A)
Paper birch	52.18	7.27	8.82	59.24	52.17	179.68	(N/A)
Eastern cottonwood	82.21	7.80	17.51	147.02	39.43	293.97	(N/A)
Birch	7.01	0.91	0.94	3.39	10.35	22.61	(N/A)
Willow	59.25	3.36	11.05	80.48	6.56	160.69	(N/A)
Eastern redbud	29.89	3.53	5.20	17.25	15.45	71.32	(N/A)
White oak	20.64	2.71	2.99	16.47	28.56	71.37	(N/A)
Catalpa	52.96	7.34	8.70	60.04	53.74	182.78	(N/A)
Cherry plum	9.67	0.95	1.32	3.63	3.51	19.07	(N/A)
River birch	16.73	2.07	2.34	10.14	19.55	50.83	(N/A)
Broadleaf Deciduous Medi	5.04	0.64	0.67	2.37	7.81	16.54	(N/A)
Cottonwood	59.63	5.17	12.77	106.32	28.56	212.46	(N/A)
Ginkgo	22.45	2.14	3.78	17.91	10.11	56.39	(N/A)
Black cherry	42.14	5.02	7.45	24.94	22.14	101.68	(N/A)
Tulip tree	44.23	6.14	7.42	39.72	45.86	143.36	(N/A)
Elm	20.64	2.71	2.99	16.47	28.56	71.37	(N/A)
Citywide Total	51.69	6.96	8.87	68.32	56.52	192.36	(N/A)

Table 7: Summary of Benefits in Dollars

Average Annual Benefits of All Trees by Species

Species	Energy	CO2	Air Quality	Stormwater	Aesthetic/Other	Total ($)	Standard Error	% of Total $
Green ash	46,230.34	6,346.52	8,022.41	62,367.47	44,437.90	167,404.64	(N/A)	28.95
Norway maple	20,734.99	2,314.86	3,573.79	21,490.34	15,448.75	63,562.72	(N/A)	10.99
Silver maple	21,802.85	4,249.36	3,946.92	38,920.13	33,117.20	102,036.46	(N/A)	17.65
Northern hackberry	17,834.46	1,765.34	3,209.71	22,214.16	13,936.47	58,960.14	(N/A)	10.20
Sugar maple	10,221.90	1,277.12	1,592.91	12,134.45	10,597.41	35,823.79	(N/A)	6.20
Red maple	5,228.72	643.86	918.30	5,096.25	6,238.53	18,125.67	(N/A)	3.13
Honeylocust	7,937.41	1,202.61	1,337.39	11,102.98	23,954.04	45,534.43	(N/A)	7.87
Apple	2,208.91	233.20	359.58	1,062.58	881.52	4,745.79	(N/A)	0.82
Blue spruce	1,443.80	122.72	161.54	2,444.80	1,528.41	5,701.28	(N/A)	0.99
Black walnut	3,380.70	469.46	580.13	4,514.51	3,247.71	12,192.51	(N/A)	2.11
American basswood	2,853.17	438.46	432.00	3,725.38	2,923.64	10,372.64	(N/A)	1.79
Northern red oak	1,061.61	103.53	149.73	1,241.36	525.58	3,081.81	(N/A)	0.53
American elm	2,189.71	215.03	456.03	2,577.45	1,731.99	7,170.21	(N/A)	1.24
Pin oak	1,617.46	305.66	211.65	1,987.33	2,441.99	6,564.09	(N/A)	1.14
Bur oak	1,382.51	189.61	245.12	2,047.59	1,286.99	5,151.82	(N/A)	0.89
Eastern red cedar	409.51	26.86	34.16	720.07	260.88	1,451.48	(N/A)	0.25
American sycamore	1,455.04	196.58	266.47	2,389.57	1,254.58	5,562.23	(N/A)	0.96
Spruce	259.40	21.58	20.73	462.93	282.65	1,047.28	(N/A)	0.18
Black maple	1,093.42	89.11	205.79	1,347.00	488.87	3,224.18	(N/A)	0.56
Littleleaf linden	635.75	103.46	104.86	633.41	963.92	2,441.40	(N/A)	0.42
White mulberry	525.73	57.48	89.74	300.85	240.00	1,213.81	(N/A)	0.21
Broadleaf Deciduous Small	201.81	15.80	32.92	107.80	40.74	399.08	(N/A)	0.07
Siberian elm	743.87	89.36	141.89	1,019.23	498.84	2,493.20	(N/A)	0.43
Eastern white pine	343.06	34.54	19.04	835.04	475.03	1,706.71	(N/A)	0.30
Plum	133.38	13.49	19.69	54.38	49.36	270.29	(N/A)	0.05
Boxelder	356.19	55.19	57.58	422.68	392.61	1,284.24	(N/A)	0.22
Kentucky coffeetree	298.01	41.27	49.64	347.21	323.30	1,059.43	(N/A)	0.18
Scotch pine	195.22	19.82	14.29	448.27	291.03	968.63	(N/A)	0.17
Amur maple	172.63	17.67	26.55	73.82	65.03	355.70	(N/A)	0.06
Norway spruce	221.00	22.63	7.10	607.58	308.74	1,167.05	(N/A)	0.20
Conifer Evergreen Large	168.21	16.54	11.28	362.62	201.13	759.78	(N/A)	0.13
Pear	169.84	17.93	27.41	75.89	65.69	356.76	(N/A)	0.06
Swamp white oak	75.66	9.03	11.93	55.39	76.33	228.33	(N/A)	0.04
White ash	163.19	22.19	26.34	144.43	240.51	596.66	(N/A)	0.10
Paper birch	260.92	36.33	44.08	296.21	260.85	898.38	(N/A)	0.16
Eastern cottonwood	411.03	39.00	87.54	735.09	197.16	1,469.83	(N/A)	0.25
Birch	28.06	3.64	3.77	13.56	41.39	90.42	(N/A)	0.02
Willow	236.99	13.43	44.21	321.92	26.23	642.78	(N/A)	0.11
Eastern redbud	89.67	10.59	15.61	51.74	46.34	213.95	(N/A)	0.04
White oak	61.91	8.13	8.98	49.42	85.67	214.11	(N/A)	0.04
Catalpa	158.87	22.01	26.10	180.13	161.23	548.34	(N/A)	0.09
Cherry plum	29.00	2.85	3.97	10.89	10.52	57.22	(N/A)	0.01
River birch	33.46	4.13	4.68	20.29	39.11	101.67	(N/A)	0.02
Broadleaf Deciduous Medi	10.09	1.28	1.35	4.74	15.62	33.07	(N/A)	0.01
Cottonwood	119.27	10.34	25.54	212.65	57.13	424.92	(N/A)	0.07
Ginkgo	44.90	4.29	7.56	35.81	20.22	112.78	(N/A)	0.02
Black cherry	84.27	10.03	14.90	49.88	44.28	203.37	(N/A)	0.04
Tulip tree	44.23	6.14	7.42	39.72	45.86	143.36	(N/A)	0.02
Elm	20.64	2.71	2.99	16.47	28.56	71.37	(N/A)	0.01
Citywide Total	155,382.75	20,922.74	26,663.37	205,373.44	169,897.51	578,239.81	(N/A)	100.00


Average Annual Benefits of All Trees by Zone ($/tree)
Avg. Annual Benefits per tree ($)
250
200
150
100
50
0
1
Citywide Total
Zone
Aesthetic/Other
Stormwater
Air Quality
CO2
Energy

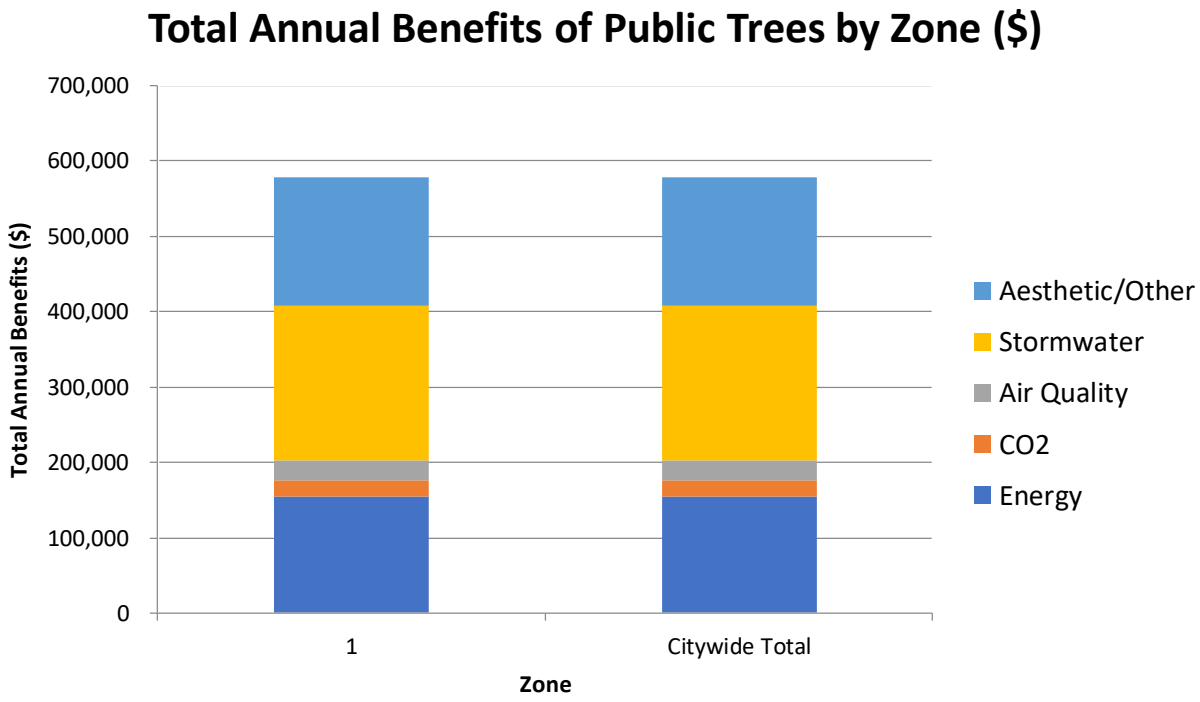
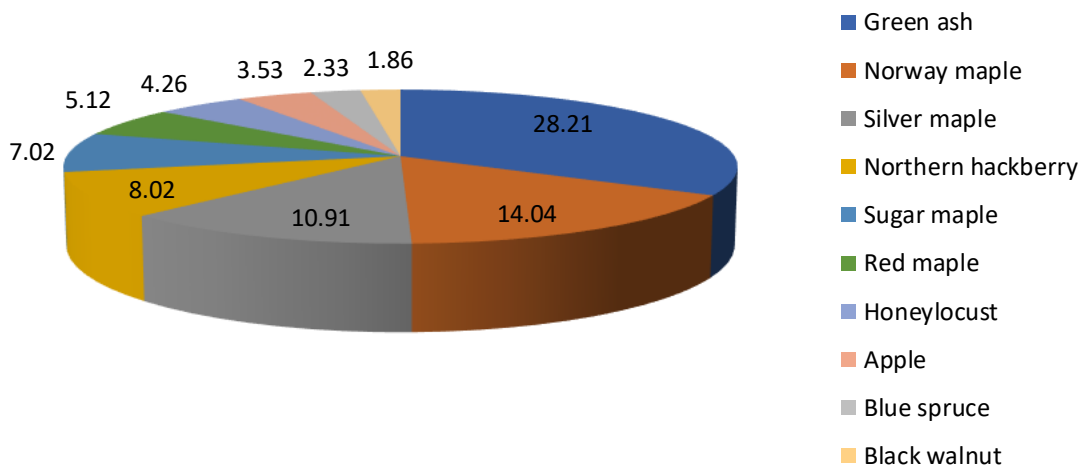

Total Annual Benefits of Public Trees by Zone ($)
Total Annual Benefits ($)
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
1
Citywide Total
Zone
Aesthetic/Other
Stormwater
Air Quality
CO2
Energy

Figure 1: Species Distribution



Humboldt
Species Distribution of Public Trees
3/12/2018

Species	Percent
Green ash	28.21
Norway maple	14.04
Silver maple	10.91
Northern hackberry	8.02
Sugar maple	7.02
Red maple	5.12
Honeylocust	4.26
Apple	3.53
Blue spruce	2.33
Black walnut	1.86
Other Species	14.70

Figure 2: Relative Age Distribution

Relative Age Distribution of Top 10 Public Tree Species for 1 (%)

DBH class (in)

Species	0 - 3	3 - 6	6 - 12	12 - 18	18 - 24	24 - 30	30 - 36	36 - 42	> 42
Green ash	1.30	1.53	11.32	26.77	25.12	20.75	10.02	3.07	0.12
Norway maple	0.95	2.13	13.98	37.91	33.89	10.19	0.95	0.00	0.00
Silver maple	0.30	0.00	3.35	9.76	25.91	27.44	21.04	7.01	5.18
Northern hackberry	2.90	0.83	4.15	14.11	18.26	26.56	25.73	4.98	2.49
Sugar maple	4.74	0.95	10.43	27.01	39.34	13.74	3.79	0.00	0.00
Red maple	9.09	16.23	25.97	28.57	11.69	5.84	2.60	0.00	0.00
Honeylocust	3.13	1.56	7.03	17.19	25.00	30.47	12.50	1.56	1.56
Apple	14.15	20.75	29.25	28.30	5.66	1.89	0.00	0.00	0.00
Blue spruce	1.43	1.43	44.29	40.00	7.14	5.71	0.00	0.00	0.00
Black walnut	0.00	0.00	0.00	23.21	39.29	28.57	8.93	0.00	0.00
Citywide Total	3.13	3.99	12.64	24.42	24.45	18.06	9.41	2.63	1.26

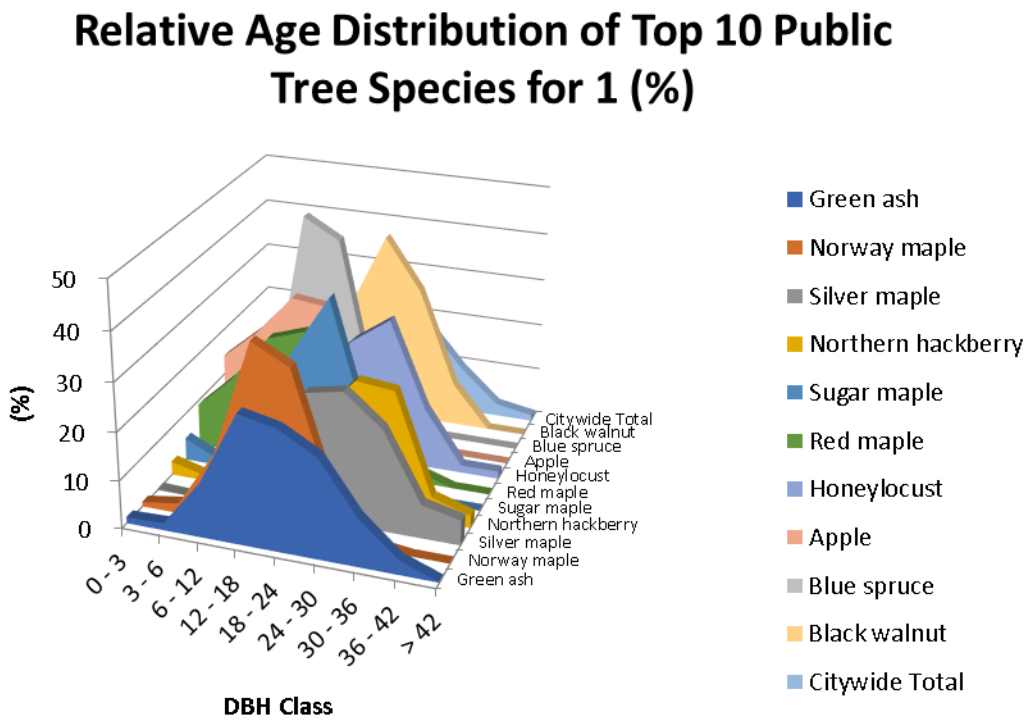
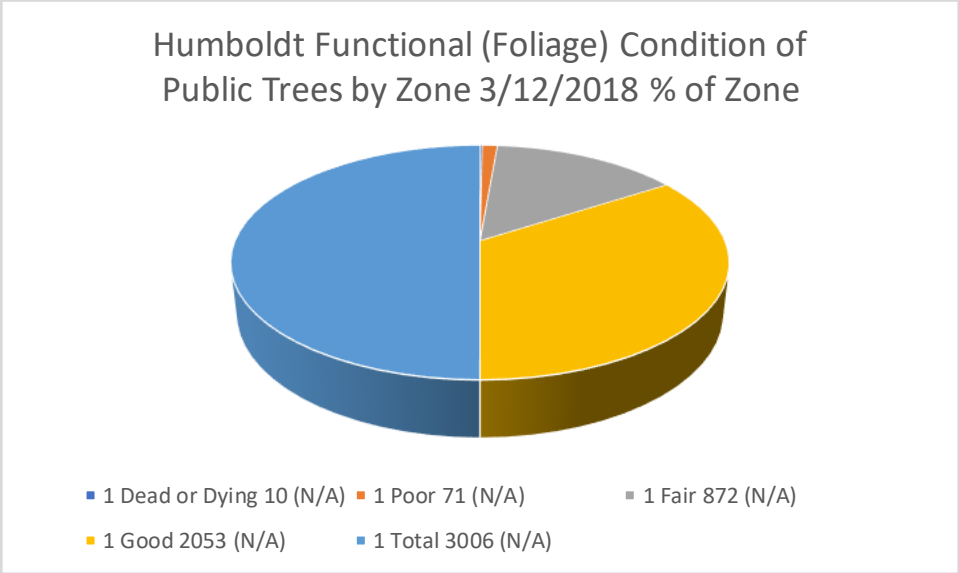


Figure 2: Relative Age Class

Figure 3: Functional Condition of all Trees

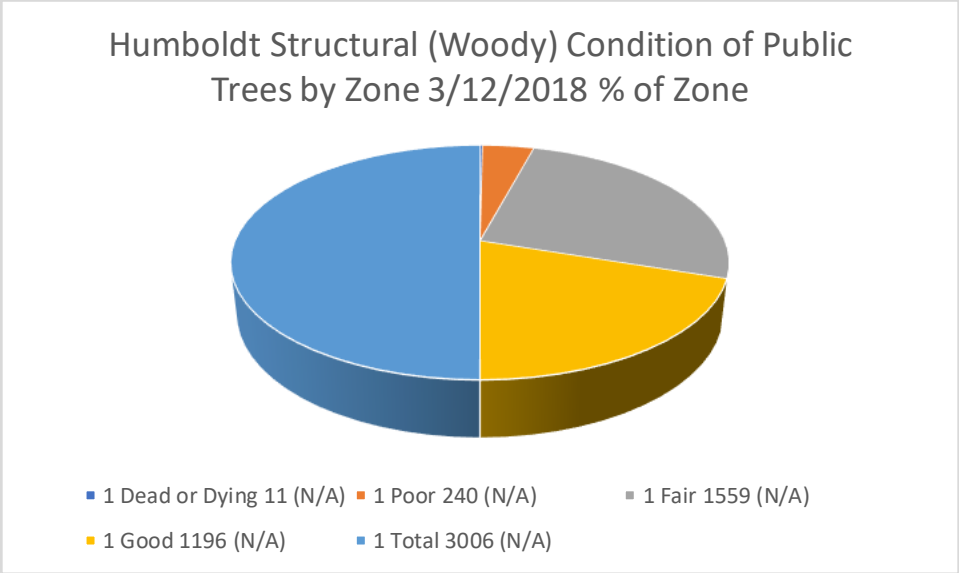


Humboldt
Functional (Foliage) Condition of Public Trees by Zone
3/12/2018

Zone	Condition	Tree Count	Standard Error	% of Zone	% of Public Trees
1	Dead or Dying	10	(N/A)	0.33	0.33
	Poor	71	(N/A)	2.36	2.36
	Fair	872	(N/A)	29.01	29.01
	Good	2053	(N/A)	68.30	68.30
	Total	3006	(N/A)	100.00	100.00

Figure 3: Foliage Condition

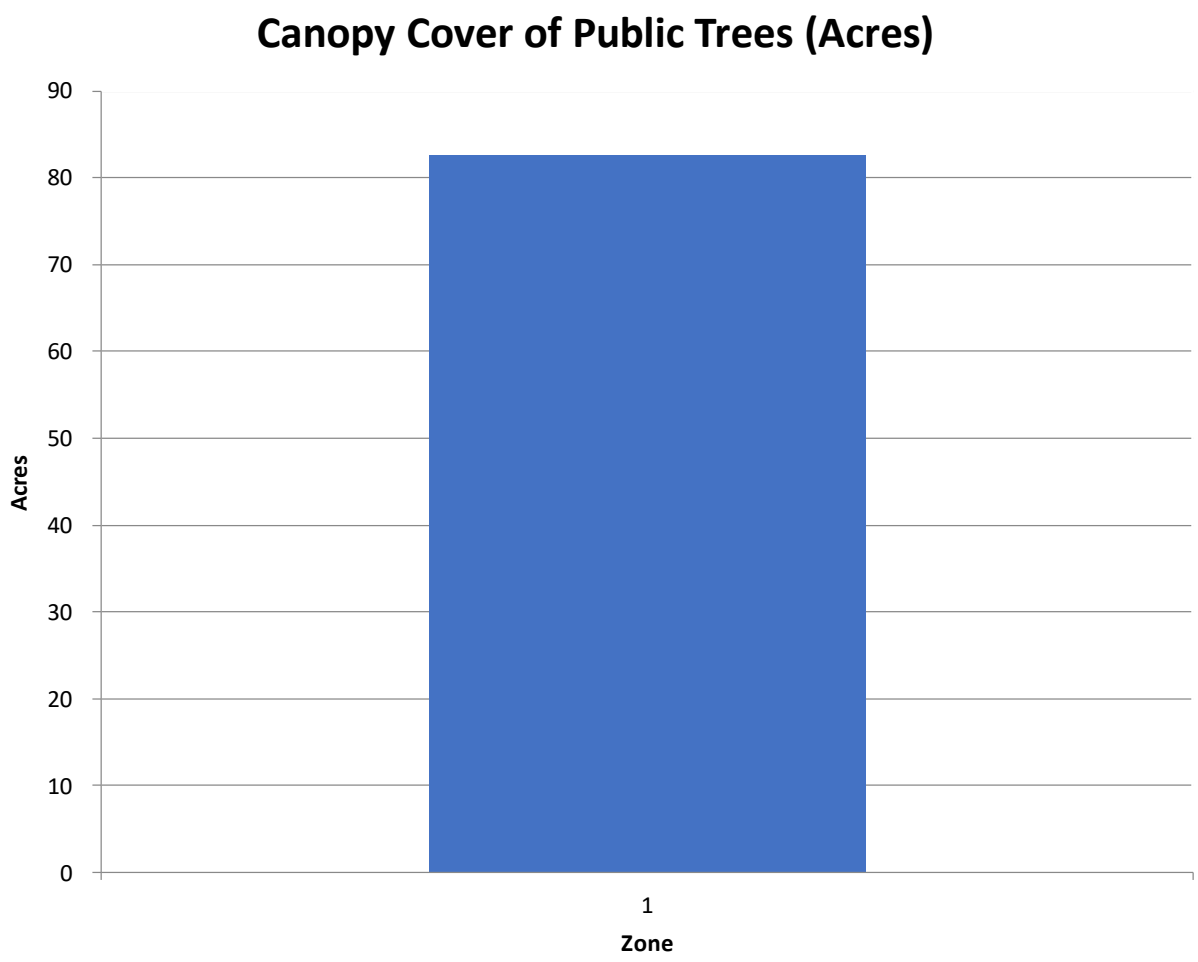
Figure 4: Structural Condition of all Trees



Humboldt
Structural (Woody) Condition of Public Trees by Zone
3/12/2018

Zone	Condition	Tree Count	Standard Error	% of Zone	% of Public Trees
1	Dead or Dying	11	(N/A)	0.37	0.37
	Poor	240	(N/A)	7.98	7.98
	Fair	1559	(N/A)	51.86	51.86
	Good	1196	(N/A)	39.79	39.79
	Total	3006	(N/A)	100.00	100.00

Figure 4: Wood Condition


Canopy Cover of Public Trees (Acres)
90
80
70
60
50
40
30
20
10
0
Acres
1
Zone

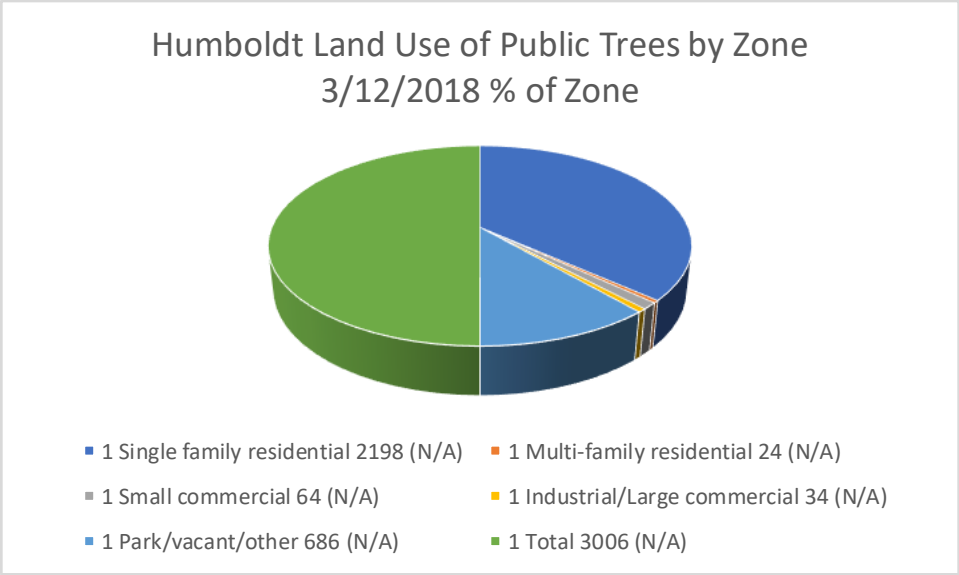
Humboldt
Canopy Cover of Public Trees (Acres)
3/12/2018

Zone	Acres	% of Total Canopy
1	82.61	100.00
Citywide Total	82.61	100.00

	Total Land Area	Total Street and Sidewalk Area	Total Canopy Cover	Canopy Cover as % of Total Land Area	Canopy Cover as % of Total Streets and Sidewalks
Citywide Total	2,969.60	50.91	82.61	2.78	162.28

Figure 5: Canopy Cover in Acres

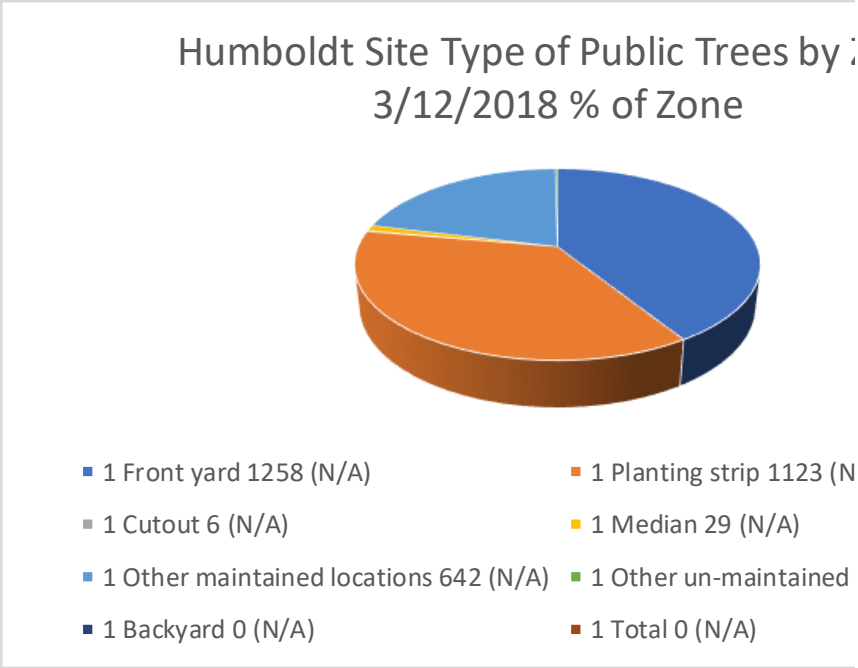
Figure 6: Land Use of city/park trees



Humboldt
Land Use of Public Trees by Zone
3/12/2018

Zone	Land Use	Tree Count	Standard Error	% of Zone	% of Public Trees
1	Single family residential	2198	(N/A)	73.12	73.12
	Multi-family residential	24	(N/A)	0.80	0.80
	Small commercial	64	(N/A)	2.13	2.13
	Industrial/Large commercial	34	(N/A)	1.13	1.13
	Park/vacant/other	686	(N/A)	22.82	22.82
	Total	3006	(N/A)	100.00	100.00

Site Type of All Trees by Zone
1/3/2018



Humboldt
Site Type of Public Trees by Zone
3/12/2018

Zone	Site Type	Tree Count	Standard Error	% of Zone	% of Public Trees
1	Front yard	1258	(N/A)	41.04	41.04
	Planting strip	1123	(N/A)	36.63	36.63
	Cutout	6	(N/A)	0.19	0.19
	Median	29	(N/A)	0.94	0.94
	Other maintained locations	642	(N/A)	20.94	20.94
	Other un-maintained locations	7	(N/A)	0.22	0.22
	Backyard	0	(N/A)	0.00	0.00
	Total	0	(N/A)	0.00	0.00

Figure 7: Location of city/park trees

Appendix B: ArcGIS Mapping

Figure 1: Location of Ash Trees

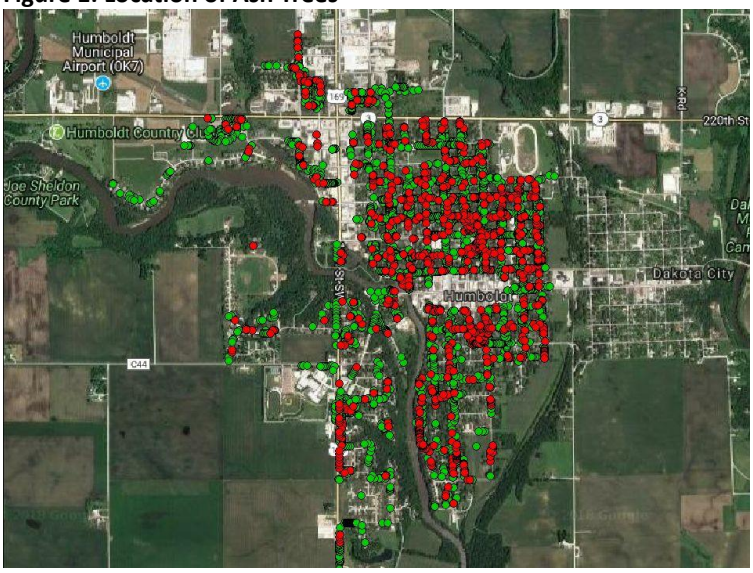


Figure 2: Location of EAB symptoms

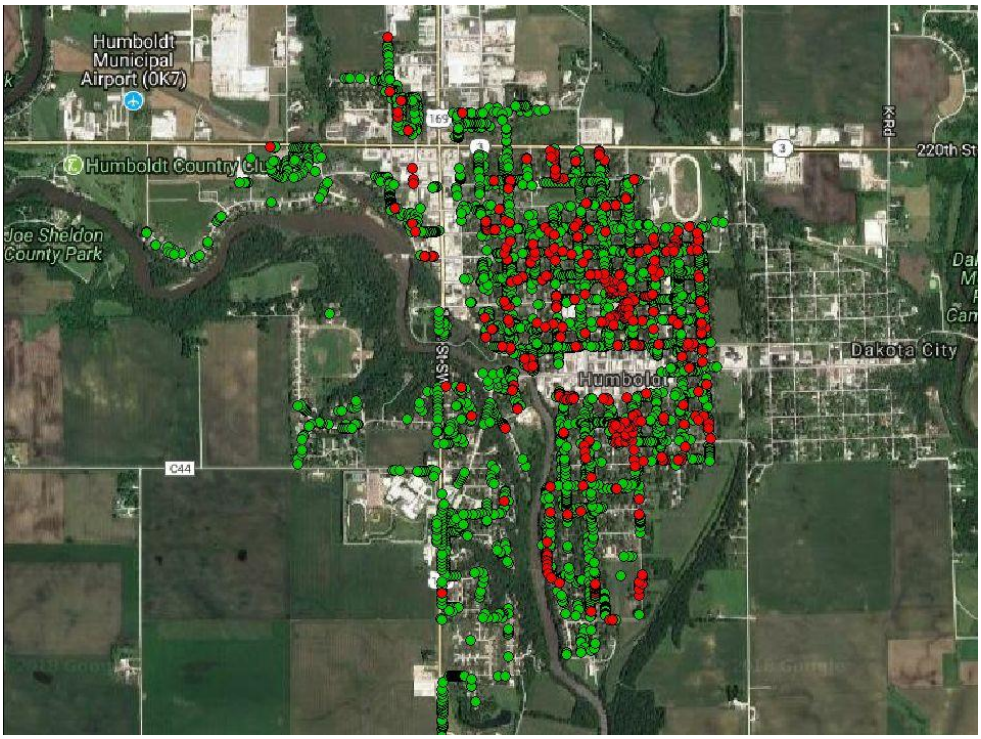


Figure 3: Location of Remove Recommended Maintenance

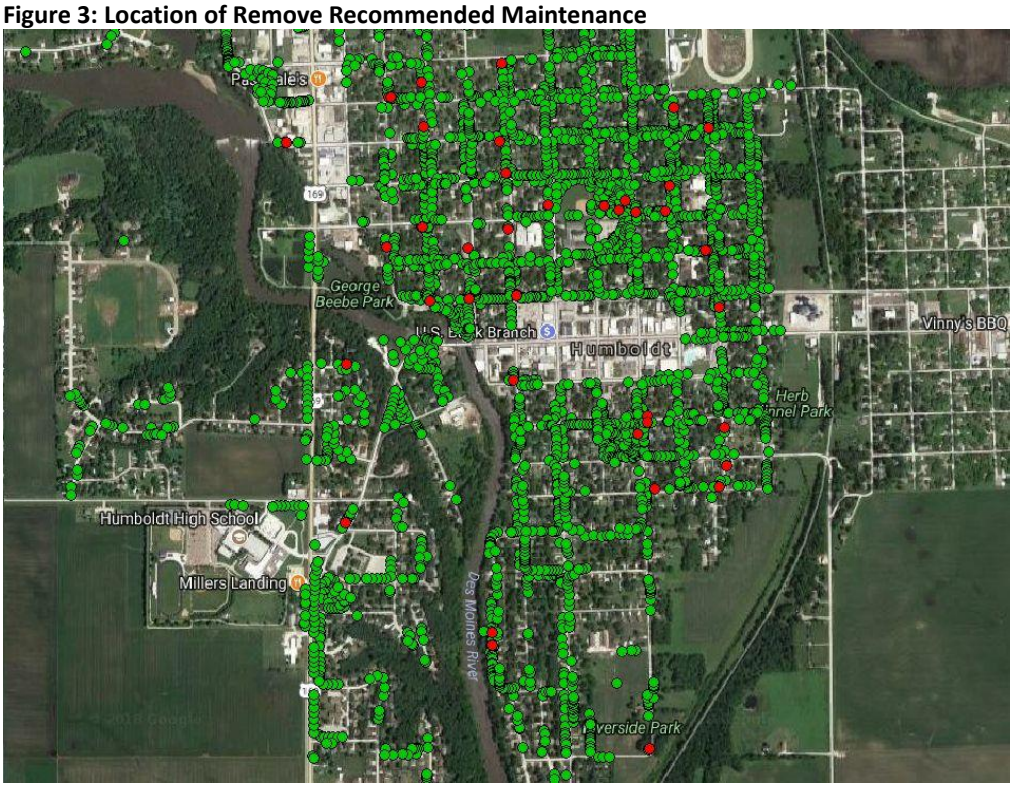


Figure 4: Location of Trees with Recommended Maintenance

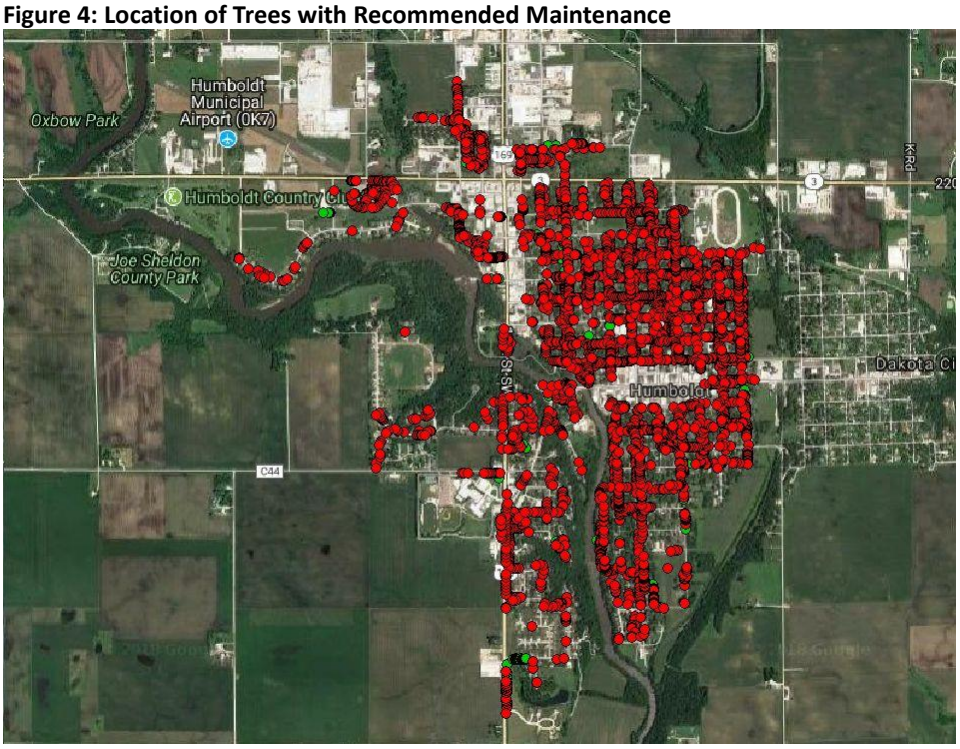


Figure 5: Location of Critical Trees

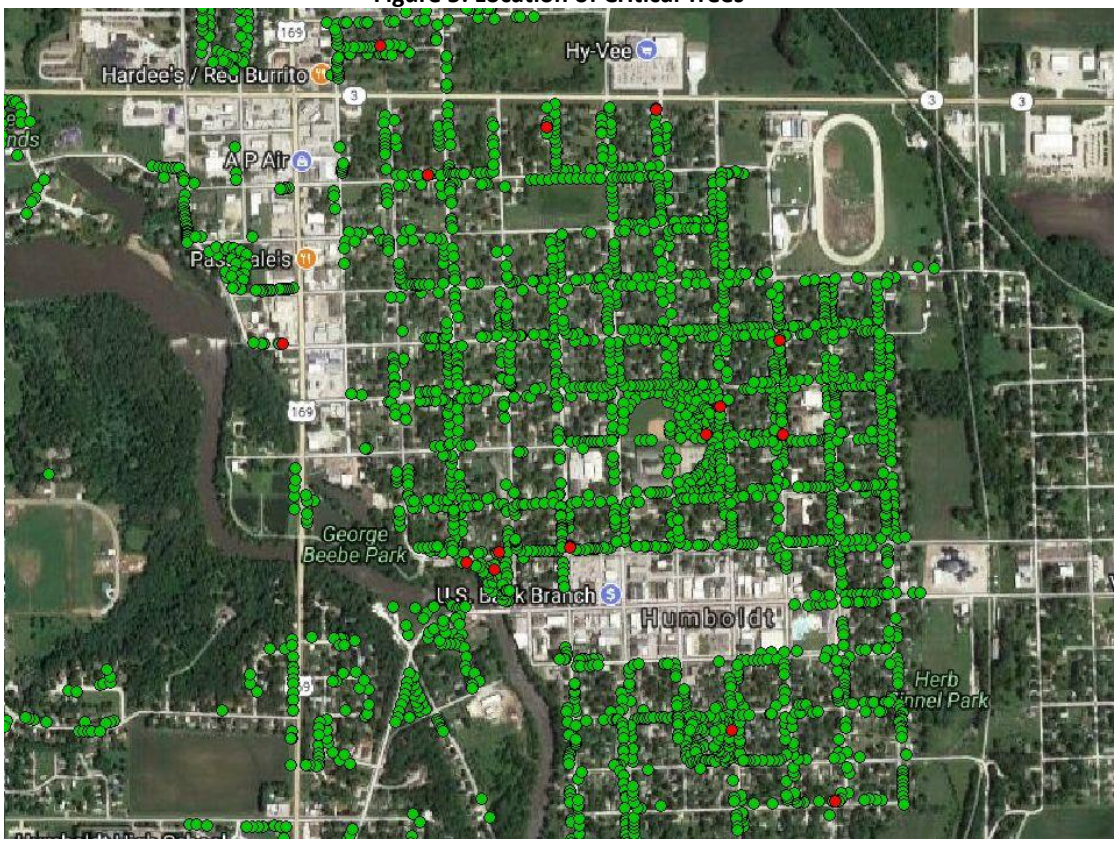


Figure 6: Location of Poor Trees

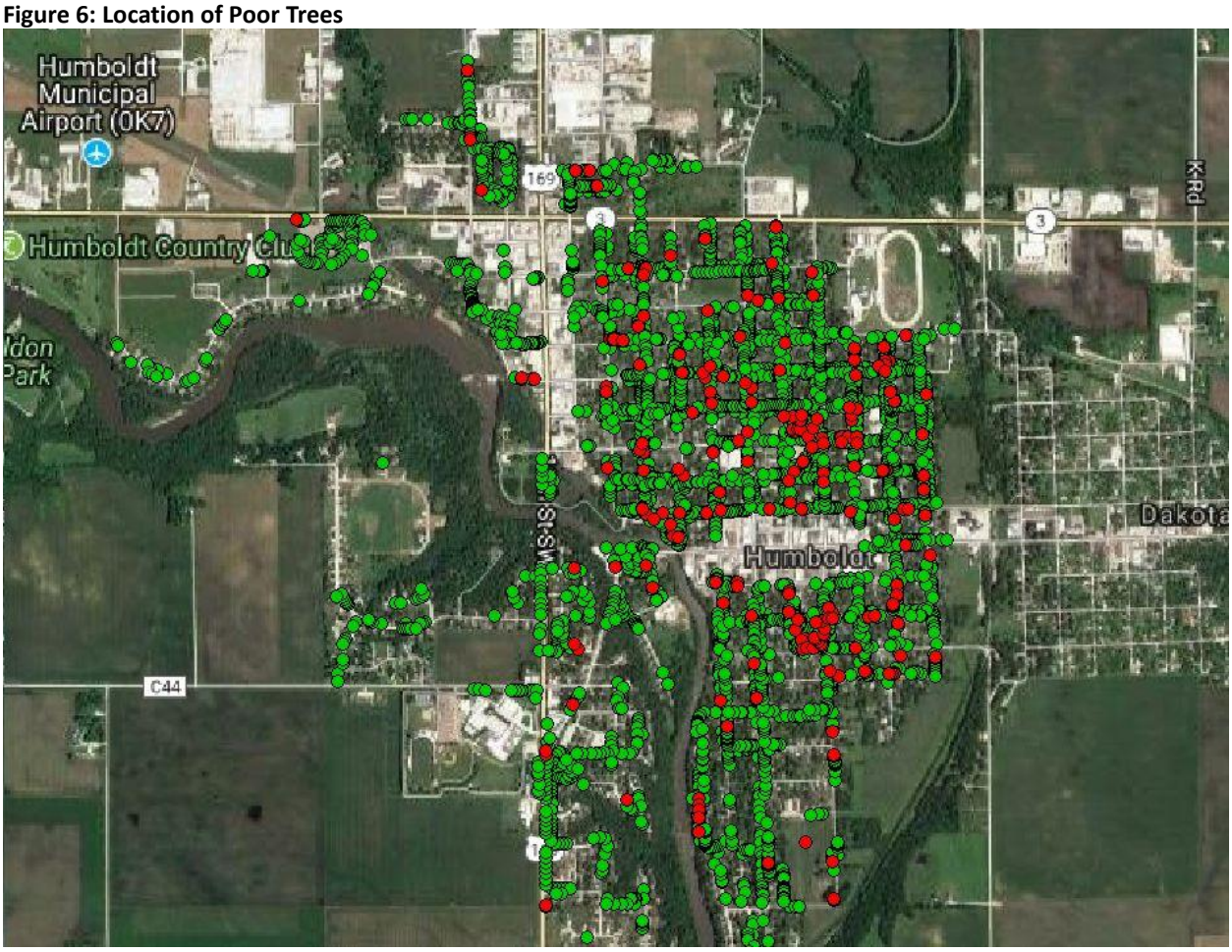


Figure 5: Maintenance Tasks *City ownership of the trees recommended for removal should be verified prior to any removal*

Appendix C: Humbolt Tree Ordinances

URBAN FORESCHAPTER 151

TREES

151.01 DEFINITION. For use in this chapter, "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.

151.02 PLANTING RESTRICTIONS. No tree shall be planted in any parking or street except in accordance with the following:

1. Alignment. All trees planted in any street shall be planted in the parking midway between the outer line of the sidewalk and the curb. In the event a curb line is not established, trees shall be planted on a line ten (10) feet from the property line.
2. Spacing. Trees shall not be planted on any parking which is less than nine (9) feet in width, or contains less than eighty-one (81) square feet of exposed soil surface per tree. Trees shall not be planted closer than twenty (20) feet from street intersections (property lines extended) and ten (10) feet from driveways. If it is at all possible trees should be planted inside the property lines and not between the sidewalk and the curb.
3. Prohibited Trees. No person shall plant in any street any fruitbearing tree or any tree of the kinds commonly known as cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut.

151.03 DUTY TO TRIM TREES. The owner or agent of the abutting property shall keep the trees on, or overhanging the street, trimmed so that all branches will be at least fifteen (15) feet above the surface of the street and eight (8) feet above the sidewalks. If the abutting property owner fails to trim the trees, the City may serve notice on the abutting property owner requiring that such action be taken within five (5) days. If such action is not taken within that time, the City may perform the required action and assess the costs against the abutting property for collection in the same manner as a property tax. *(Code of Iowa, Sec. 364.12[2c, d & e])*

151.04 TRIMMING TREES TO BE SUPERVISED. Except as allowed in Section 151.03, it is unlawful for any person to trim or cut any tree in a street or public place unless the work is done under the supervision of the City.

151.05 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.

151.06 INSPECTION AND REMOVAL. The Council 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 Council may cause such condition to be corrected by treatment or removal. The Council may also 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 Council 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 14 days of receipt of notice, the Council may cause the condition to be corrected and the cost assessed against the property. *(Code of Iowa, Sec. 364.12[3b & h])*

[The next page is 741]