



TOWN OF FISHERS

Tree Inventory Report- Phase One

PREPARED BY



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Introduction

In October of 2012, the Town of Fishers contacted Ping's Tree Service, Inc. inquiring about tree inventory services. Ping's Tree Service, Inc. submitted a tree inventory proposal and after additional meetings received a tree inventory contract in the amount of \$12,500 that was enacted on December 31, 2013. The contract was for tree inventory data collection and related analysis required by the Indiana Department of Natural Resources (IDNR) Community and Urban Forestry Division. A Grant from IDNR funded a portion of this project.

Data collection for the project began on January 15, 2014 and was completed on March 31, 2014. A total of 2,993 trees were inventoried. All data collection was completed by one of the following arborists: Andrew Mertz (American Society of Consulting Arborists (ASCA) Registered Consulting Arborist #542 and International Society of Arboriculture (ISA) Certified Arborist #IN-3286A), Matt Hill (ISA Certified Arborist #IN-3391A), or Julie Wiseman (ISA Certified Arborist #IN-3290A). This report was compiled by Andrew Mertz.

The majority of trees inventoried were located within the Thomas Weaver Memorial Municipal Complex Grounds and within Town of Fisher's park property. Most parks with landscape trees were inventoried. A few right of ways along major thoroughfares were also inventoried including portions of 106th and 116th Streets.

The primary driver for this project was a need to quantify the number of ash trees located within municipal property. Ash trees are being killed by the thousands in communities throughout the eastern United States by the emerald ash borer, an invasive-exotic beetle originating from China.

Methodology

Data was collected for all properties using the same methodology. A Trimble Geo Explorer XT series GPS unit was used for data collection. The unit is capable of collecting data at sub meter accuracy. All trees in maintained areas such as turf areas, parking lot islands, and landscape beds were inventoried. Trees along wooded edges or along trails in parks were inventoried only if they posed significant risks to people or property due to condition and location.

The tree inventory matrix collected information that can be used with the US Forest i-tree software for further analytical purposes. This is generally a requirement for state funding by the Indiana Department of Natural Resources for tree inventory projects. The end product is an ESRI geo-database. It is housed in the Town of Fishers GIS department.

The tree inventory collected a wide range of information, some of which was collected out in the field, while other information was added during post processing.

Data Collection

The following information for each tree was collected in the field.

Common Name

Genus

Species

Four Letter Tree Code (For example Quercus alba would be QUAL)

Site Type-

- | | |
|-------------------------------|-------------------------|
| 1. Front Yard | 6. Other –Un-maintained |
| 2. Planting Strip | Locations |
| 3. Cutout/Pit | 7. Side yard |
| 4. Median | 8. Backyard |
| 5. Other Maintained Locations | |

Diameter at Breast Height (DBH) - the standard measurement for tree size

DBH Size Class

Recommended Primary Maintenance

- | | |
|---------------------|------------------|
| 1. Large Tree Clean | 4. Removal |
| 2. Small Tree Clean | 5. Stump Removal |
| 3. Young Tree Train | 6. Plant Tree |

Recommended Secondary Maintenance (if any)

- | | |
|----------------|--------------|
| 1. Raise | 5. Utility |
| 2. Reduce | 6. Treatment |
| 3. Thin | 7. None |
| 4. Restoration | |

Sidewalk Damage

1. None (heaved <3/4 inch raised)
2. Low (heaved 3/4-1 1/2 inches)
3. Medium (heaved 1 1/2- 3 inches)
4. High (heaved 3 inches)

Overhead Utility Lines

1. Not Present
2. Present but no conflicting
3. Present and conflicting

Condition

1. Dead/dying (Extreme Problem)
2. Poor (Major Problem)
3. Fair (Minor Problem)
4. Good (No Apparent Problem)

Size of Defect

1. (NA)
2. <4 inches
3. 4-20 inches
4. >20 inches

Target Rating

1. (N/A)
2. Occasional Use
3. Intermittent Use
4. Frequent Use

Other Risk Factors

1. (N/A)
2. No Additional Risk
3. Additional Risk
4. High Additional Risk

Further Hazard Tree Investigation Necessary? (Yes if a tree needs a higher level of tree risk assessment before a recommendation can be made, null if no further assessment is required.)

Date Collected

Comment Fields- Two fields provided for notes

Risk Ratings (automatically tabulated by adding Size of Defect, Target Rating, and Other Risk Factors fields)

1. 3-4 None
2. 5-6 Low Risk
3. 7-8 Moderate Risk
4. 9-10 Severe Risk

Longitude and Latitude

The following two attributes will be completed by the certified arborist as part of post processing.

Native Range

1. Native to Hamilton County
2. Native to Indiana but not Hamilton County
3. Native to North America but not Indiana
4. Native to Europe

5. Native to Asia
6. Native to South America
7. Cultivated Variety

Invasiveness

1. Known invasive species in Hamilton County
2. Known invasive species in Indiana
3. Known invasive species in eastern United States
4. Potential invasive species in eastern United States

For cost savings purposes we recommended the following attribute tables be populated by the Town of Fishers during post processing by their GIS team.

Land Use

1. Single Family Residential
2. Multi-Family Residential
3. Small Commercial
4. Industrial/Large Commercial
5. Park/Vacant

Parcel Number or for street trees Adjacent Parcel Number

Park, Government Building, or School Name (If Applicable)

Address or Adjacent Address- Including the following tables

1. Street Number
2. Prefix Direction
3. Street Name
4. Suffix
5. Suffix Direction

The geo-database is also able to record attributes for trees plantings in the future such as:

Packaging

Nursery Information

Cultivated Variety (if applicable)

Date Installed

Installer Information

Flora Permit Information (if applicable)

Project Name

Results

Tree Population by Species

Appendices One, Two, and Three are i-tree reports that summarize the general population statistics for species by category (deciduous or coniferous). Each species is further broken down by size (diameter at breast height).

Appendix One summarizes large broadleaf deciduous species. Of the 2,018 trees inventoried, green ash was the most frequently encountered (594). The next four most commonly found were red maple (332), honey locust (153), black walnut (116), and sugar maple (103). Of note, 82 white ash were also identified.

Appendix Two summarizes medium and small sized deciduous species. Of the 254 medium sized trees inventoried, callery pear was the most frequently encountered (92). The next four most commonly found were little leaf linden (57), European hornbeam (36), slippery elm (26), and European white mulberry (24). The elms and mulberries were along wooded edges while the others were species planted in maintained areas.

Of the 311 small sized deciduous trees inventoried, serviceberry was the most frequently encountered (71). The next four most commonly found were redbud (70), crabapple (65), hawthorn (49), and Amur maple (13).

Appendix Three summarizes large and medium coniferous trees inventoried. Four species of large coniferous trees were identified totaling 273 individual trees. Their totals, from largest to smallest were; Norway spruce (97), Colorado spruce (94), eastern white pine (81), and white spruce (1). Five species of medium sized coniferous trees were identified totaling 136 individual trees. Their numbers were from largest to smallest; Austrian Pine (62), Chinese Juniper (37), northern white cedar (23), eastern red cedar (9), and eastern hemlock (5).

Tree Population by Age

Diameter at breast height (DBH) is used by i-tree to age populations of tree species. Appendix Four was generated by i-tree and summarizes the relative age distribution of the ten most commonly found trees.

Over 68% of all trees inventoried were twelve inches in diameter or smaller so the overall canopy is skewed towards younger trees. Of note, over 90% of red maples were twelve inches in diameter or smaller and all blue spruce trees inventoried were 12" in diameter or smaller.

Land Use

Appendix Five is an i-tree report that breaks down the location of trees by land use. The categories are set by the i-tree software. 2,385 of the trees inventoried were located in a park or park-like setting. 375 of the trees were in or adjacent to a large commercial or industrial complex (examples include large government buildings and the sewage treatment facility). 91 trees were adjacent to small commercial facilities. 88 trees were adjacent to multi-family residences while 53 trees were adjacent to single family residences.

Sidewalk and Overhead Utility Conflicts

No i-tree reports were completed for each of these categories because very few conflicts were observed. These conflicts are much more prevalent in neighborhoods than in parks and along major thoroughfares.

Out of the 2,993 trees inventoried, only three instances of sidewalks being raised due to tree conflicts was reported.

There were 49 instances of there being a conflict between trees and overhead power lines. There were 119 instances of a tree being close to a power line but not being in conflict with the lines. The remaining trees were entirely free of overhead utility conflicts.

Native Range and Invasiveness Potential

Of the 2,993 trees inventoried, 2,052 of them were individuals belonging to species native to Hamilton County. There is no ecological threat from any of these species.

138 of the trees inventoried are individuals that belong to species native to Indiana but their natural range does not include Hamilton County. Examples include eastern hemlock, river birch, and eastern white pine. None of these species are listed as invasive species in Indiana.

125 individual trees belonged to species native to North America but not Indiana. Examples include northern white cedar and Colorado spruce. None of these species are listed as invasive species in Indiana.

290 individual trees inventoried are from species native to Europe. Of these, Norway maple and white mulberry are known invasive species in Indiana, including Hamilton County. None of the other species are currently listed.

206 individual trees inventoried are from species native to Asia. Of these callery pear and Siberian elm are known invasive species in Indiana, including Hamilton County. Kousa Dogwood and Amur maple are listed invasive species in other parts of the United States. Japanese tree lilac can naturalize into wooded areas in Indiana but is not currently listed.

151 of the trees were not listed by range, but as a cultivated variety. These include serviceberry, crabapple, and magnolia. Some of these trees, including serviceberry, originated from individual specimens native to some part of North America. However, there are also some species in this genus originating from other parts of the world. We only identified these to genus and not species due to the large variety of cultivars for these trees and did not want to categorize any of them as native when they may not be.

Benefits

i-Tree calculates a report entitled “Annual Benefits of Public Trees by Species (\$/tree)” for each species inventoried. This benefits are listed in Appendix Six of this report. Benefits calculated include energy savings, carbon dioxide sequestration, other air quality benefits, storm water benefits, and aesthetics benefits. On average each tree produces \$49.91 in annual benefits. As expected large deciduous trees provide more environmental benefits than smaller deciduous trees or conifers.

Condition

Appendix Seven is an i-tree report that summarizes the condition of all trees inventoried by condition class. The condition choices are set by i-tree software. The condition classes are good, fair, poor, or dead or dying. Appendix Eight is an i-tree report that summarizes the condition classes by species. Results for the most commonly encountered large, medium, and small deciduous trees as well as conifers are discussed below.

Essentially all ash trees were reported as dead or dying because they were already dead due to emerald ash borers or infested with the borer. A few individuals could possibly be treated but there are no plans to do so. There are large numbers of ash trees planted in parks as well as naturally growing trees along wooded edges.

About 62% of red maples inventoried were reported to be in fair condition and 20% were reported to be in poor condition. Many individuals had poor structure due to co-dominant branching. Other common defect encountered while inspecting red maples included frost cracking and damage caused by borers.

Most honeylocust trees (86%) were reported to be in fair condition with the rest either being in poor condition or dead. Calico scale was a serious pest issue for many of the honeylocusts observed.

About 88% of the black walnuts observed were reported to be in fair condition. No serious pest issues were observed. Thousand Canker Disease is a serious fungal threat to this species and all other species in this family but the disease has not been found in Indiana. It has been found in Ohio relatively close to the Indiana border.

71% of sugar maples observed were reported to be in fair condition. 14% were reported to be in poor condition and 8 were dead. The poor and dead trees includes trees along wooded edges.

About 80% of callery pear trees were reported as being in fair condition with 18% reported to be in poor condition. Callery pears are plagued with structural issues due to co-dominant branching which often results in partial tree failures and necessary removals.

77% of the little leaf linden trees observed were reported to be in fair condition with most of the balance (20%) being reported as in poor condition.

Most of the European hornbeams observed were in one planting group. 83% were reported to be in fair condition.

Over 70% of the slippery elms observed were reported to be dead. This species was mostly encountered in wooded edges where only dead trees or trees in poor condition were inventoried. The handful of trees that were in good or fair condition were naturally growing trees in maintained areas.

Just like the slippery elm trees, white mulberry trees were only inventoried in wooded edges if they had condition issues that need to be addressed. 67% of those observed were reported to be in poor condition while the rest are in wooded edges and have condition issues that need to be mitigated (require pruning).

85% of serviceberry trees observed were reported to be in fair condition and about 10% were reported to be in good condition. Compared to other small trees, serviceberry has few pest problems.

About 78% of crabapple trees observed were reported to be in fair condition with pretty equal number being reported as dead, poor, and in good condition. Apple scab, a common disease of crabapples, was observed on many crabapples.

57% of all hawthorns observed were reported to be in fair condition while 32% were reported to be in good condition.

85% of Amur maple trees observed were reported to be in fair condition while the remaining trees were reported to be in poor condition.

About 82% of the Norway spruce trees were reported to be in fair condition while about 12% were reported to be in poor condition. Common condition problems with Norway spruce in this area include needle cast disease, bagworms, drought damage, spruce spider mites and cytospora canker.

About 91% of the blue spruce trees observed were reported to be in fair condition with pretty equal amount reported to be dead, in poor condition, or in good condition. Most of the blue spruce trees observed were relatively young trees. They suffer similar condition problems of other spruce species.

85% of white pines observed were reported to be in fair condition while about 12% were reported to be in poor condition. They are highly susceptible to drought stress, damage from salt spray, and damage from yellow bellied sapsuckers.

Almost all (98%) Austrian pines observed were reported to be in fair condition. Diplodia tip blight is a common pest problem with this species. As with other pines, they are also susceptible to drought stress and damage from yellow bellied sapsuckers.

All Chinese Junipers were observed to be in fair condition. They were all growing in the same location. They were growing near a wall and did demonstrate phototropic growth. Chinese junipers are more resistant to twig blights and rust diseases than other species of junipers.

70% of northern white cedars were reported to be in good condition with the rest reported as being in fair condition. Note that most of these trees are very young. A host of environmental and pest issues can impact northern white cedars.

Only a few eastern red cedars were inventoried and 78% were reported to be in fair condition. They are susceptible to twig bight and cedar-apple rust.

60% of eastern hemlock trees observed were reported to be in fair condition. 20% were reported to be in good condition and 20% were reported to be in poor condition.

Prioritized Maintenance

Maintenance needs were recorded for each tree inventoried. Primary maintenance choices included: no maintenance, large tree clean, small tree clean, young tree train, removal, stump removal, and plant tree. These category choices are from the i-tree software.

Cleaning refers to removing deadwood and removing damaged, rubbing, crossing and other individual branches that may be causing an issue. It can also include some structural pruning to improve the structure of the tree.

Stumps and planting locations were not recorded as part of this project but these choices are built into the database for future use.

A risk rating was also calculated for each tree that incorporated the size of defects in each tree, frequency of a target (i.e. a person, automobile, a home, etc.) being within striking distance of a tree if and when it fails, and other risk factors. Risk rating outcomes could be one of the following for each tree: low risk, moderate risk, or severe risk. Keep in mind every standing tree poses some chance of risk even though that risk can be very low.

Of the 2,993 trees inventoried, 967 of them were reported to require removal with more than half of these being ash trees. 494 were reported to pose severe risk due to their condition and location.

377 trees were reported to be large trees that needed to be cleaned. Large trees were defined for this project as trees requiring an aerial lift to prune, regardless of species. Of these, 28 were reported to pose a severe risk until mitigation (cleaning) was completed.

1,221 trees were reported to be small trees that needed to be cleaned. Small trees were defined as trees that could be pruned from the ground (with pole saws if needed) regardless of species. As expected only a small number of these (5) were reported to pose severe risks. Many of these trees were young trees that will eventually be large, such as red maples and American elms. Many of these trees were reported to have structural issues (see the comment column in the geo-database), in particular co-dominant branching.

In terms of pruning, 428 of the trees inventoried were reported to be in no need of pruning and do not need to be removed. Many of these were conifers which typically do not require pruning under normal circumstances.

Discussion

Per the inventory, 32% of the trees inventoried need to be removed (967 trees). This is a high percentage. The data set is skewed because only trees needing mitigation were recorded in wooded edges (i.e. trees that needed no mitigation were not inventoried in un-maintained areas). That being said the Town of Fishers needs to know where all of their trees in need of removal are located.

All removals are not equal. There are many removals that may require specialized equipment (aerial lift trucks, cranes, etc.) and these will cost more to mitigate. Others however are not as technical and will require less equipment.

Crown cleaning was the primary pruning recommendation for all trees. That being said, some species could benefit from thinning and/or crown reductions. For example, callery pear is an example of a species that may have increased longevity if thinned and reduced every few years.

A plant health care program other than pruning could also benefit many species that have predictable pest and environmental issues. These include all conifers and crabapples. Other species, such as honeylocusts with calico scale, have an acute issue that needs to be addressed at the appropriate time this coming season.

A relatively small palette of tree species has been utilized for public tree plantings. Only 64 species were encountered while collecting data. Some species, such as red maple, have been overplanted. This can threaten the overall canopy if a new pest enters the environment and uses one of these overplanted species as a host. This is currently happening with ash trees. New threats on the horizon, such as Asian long horn beetle and Thousand Canker Disease, can adversely impact several species of trees including all species of maple.

Other small species have also been over planted, such as callery pear, in areas where large deciduous trees could be planted. Larger species of trees provide more environmental benefits than smaller ones.

Recommendations

The following general recommendations are as follows:

- Utilize the tree inventory to prioritize the most urgent mitigation (removals and pruning) as resources allow.
- An area of particular concern was the wooded edge behind the library in the Weaver Government Complex. Many large dead ash trees are in this area and should be removed as soon as possible. Some of these trees have already started to fail.
- Train in-house crews to properly prune small trees (cleaning and structural pruning). This will reduce failures and overall maintenance costs in the long run by increasing the longevity of these trees and reducing future tree failures.
- Continue to expand the town's plant health care program to increase the longevity of commonly planted species with predictable pest and environmental issues. We recommend that all chemical application be completed by a registered technician or a holder of a Category 3A or 6 pesticide license issued by the Office of the Indiana State Chemist.
- Expand the palette of tree species in community tree planting operations. Consider using more large native species that were under represented in the tree inventory such as native oaks and hickories, black gum, Kentucky coffee trees, tulip, and American basswood to name a few. Consult local nurseries for availability.
- One a related note replace ash trees and other large deciduous trees that need to be removed with other large deciduous trees to avoid a reduction of environmental benefits.
- Avoid planting exotic species that are documented to be an invasive threat in Indiana. Check with organizations, such as the Midwest Invasive Plant Network, for updates to the list of documented invasive tree species.

Appendix One- Town Of Fishers										
Population Summary of Public Trees										
Species	DBH Class (in)									Total
	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	> 42	
Broadleaf Deciduous Large (BDL)										
Green ash	1	47	237	157	96	26	20	4	6	594
Red maple	7	155	155	8	3	2	1	0	1	332
Honeylocust	4	13	84	27	10	6	2	3	4	153
Black walnut	0	0	38	65	10	1	1	0	1	116
Sugar maple	2	11	70	13	6	1	0	0	0	103
White ash	1	8	25	26	18	8	2	0	0	88
Northern red oak	32	8	18	12	5	4	1	3	2	85
Northern hackberry	1	5	31	23	10	4	4	1	3	82
Black cherry	0	3	29	30	11	5	2	1	1	82
River birch	1	27	11	4	7	4	4	0	0	58
American elm	1	39	6	3	2	0	1	0	0	52
Bitternut hickory	0	0	16	14	3	1	1	0	1	36
Pin oak	5	8	1	4	3	5	3	1	0	30
Tulip tree	18	9	2	0	0	0	0	0	0	29
Japanese zelkova	0	24	0	0	0	0	0	0	0	24
White oak	14	5	0	0	0	0	0	0	0	19
Norway maple	0	3	12	2	0	0	0	0	0	17
Silver maple	0	1	0	0	5	2	3	3	1	15
Eastern cottonwood	0	1	2	4	1	2	1	1	1	13
Bur oak	2	5	2	0	1	1	0	1	0	12
Shagbark hickory	0	0	6	0	5	0	0	0	0	11
American sycamore	1	0	0	0	0	1	3	2	2	9
Black locust	1	1	5	1	1	0	0	0	0	9
Ginkgo	7	0	0	0	0	0	0	0	0	7
English oak	0	0	1	1	0	2	0	0	3	7
Sweetgum	0	2	5	0	0	0	0	0	0	7
European beech	0	1	3	0	0	0	0	0	0	4
Baldcypress	4	0	0	0	0	0	0	0	0	4
Pignut hickory	0	0	1	0	2	1	0	0	0	4
Kentucky coffeetree	4	0	0	0	0	0	0	0	0	4
American beech	0	1	0	1	0	0	1	0	0	3
Siberian elm	0	0	0	1	0	1	1	0	0	3
American basswood	1	1	1	0	0	0	0	0	0	3
Swamp white oak	1	0	1	0	0	0	0	0	0	2
Northern catalpa	0	0	0	0	0	1	0	0	0	1
Total	108	378	762	396	199	78	51	20	26	2018

Appendix Two- Town Of Fishers

Population Summary of Public Trees										
Species	DBH Class (in)									Total
	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	> 42	
Broadleaf Deciduous Medium (BDM)										
Callery pear	0	23	51	15	3	0	0	0	0	92
Littleleaf linden	10	43	2	2	0	0	0	0	0	57
Hornbeam 'Fastigiata'	17	18	0	1	0	0	0	0	0	36
Slippery elm	1	3	14	5	2	0	1	0	0	26
Mulberry	0	1	3	7	9	1	0	3	0	24
Maple	8	0	0	0	0	0	0	0	0	8
Boxelder	0	0	4	1	1	0	0	1	0	7
Willow	0	0	2	2	0	0	0	0	0	4
Total	36	88	76	33	15	1	1	4	0	254
Species	DBH Class (in)									Total
	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	> 42	
Broadleaf Deciduous Small (BDS)										
Eastern serviceberry	14	18	26	5	1	7	0	0	0	71
Eastern redbud	1	18	28	15	7	1	0	0	0	70
Apple	0	21	41	3	0	0	0	0	0	65
Hawthorn	0	1	39	3	2	1	3	0	0	49
Amur maple	0	5	7	1	0	0	0	0	0	13
Magnolia	0	3	6	3	0	0	0	0	0	12
Lilac	1	6	4	0	0	0	0	0	0	11
Green hawthorn	0	9	0	0	0	0	0	0	0	9
Dogwood	0	3	0	1	0	0	0	0	0	4
Japanese maple	0	1	1	1	0	0	0	0	0	3
Higan cherry	0	0	2	0	0	0	0	0	0	2
Flowering dogwood	1	0	0	0	0	0	0	0	0	1
Plum	0	0	1	0	0	0	0	0	0	1
Total	17	85	155	32	10	9	3	0	0	311

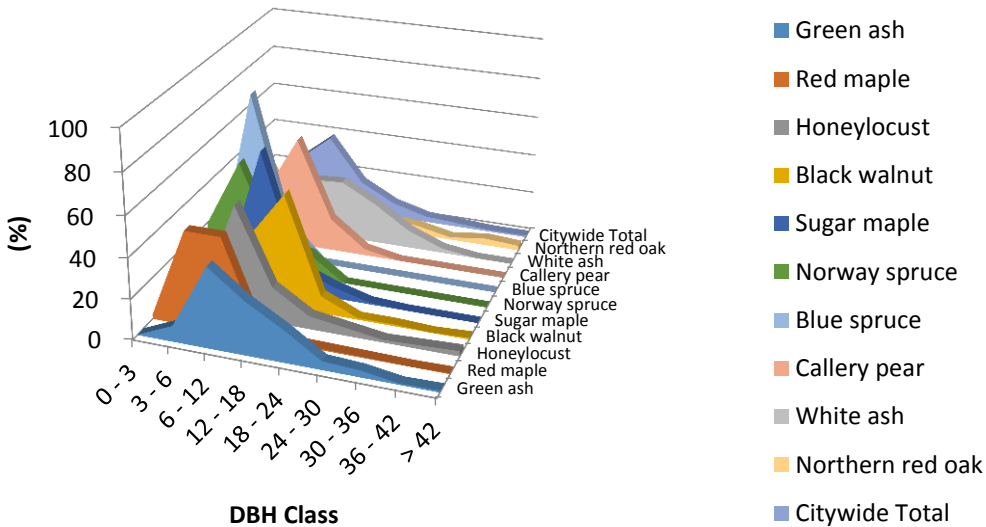
Appendix Three- Town Of Fishers

Population Summary of Public Trees										
Species	DBH Class (in)									Total
	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	> 42	
Conifer Evergreen Large (CEL)										
Norway spruce	19	52	14	12	0	0	0	0	0	97
Blue spruce	1	77	16	0	0	0	0	0	0	94
Eastern white pine	8	43	23	7	0	0	0	0	0	81
White spruce	0	0	1	0	0	0	0	0	0	1
Total	28	172	54	19	0	0	0	0	0	273
Conifer Evergreen Medium (CEM)										
Austrian pine	0	1	53	8	0	0	0	0	0	62
Chinese Juniper	0	0	37	0	0	0	0	0	0	37
Northern white cedar	5	0	11	7	0	0	0	0	0	23
Eastern red cedar	0	5	2	1	1	0	0	0	0	9
Eastern hemlock	3	2	0	0	0	0	0	0	0	5
Total	8	8	66	16	1	0	0	0	0	136

Appendix Four- Town of Fishers

Species	DBH class (in)								
	0 - 3	3 - 6	6 - 12	12 - 18	18 - 24	24 - 30	30 - 36	36 - 42	> 42
Green ash	0.17	7.91	39.90	26.43	16.16	4.38	3.37	0.67	1.01
Red maple	2.11	46.69	46.69	2.41	0.90	0.60	0.30	0.00	0.30
Honeylocust	2.61	8.50	54.90	17.65	6.54	3.92	1.31	1.96	2.61
Black walnut	0.00	0.00	32.76	56.03	8.62	0.86	0.86	0.00	0.86
Sugar maple	1.94	10.68	67.96	12.62	5.83	0.97	0.00	0.00	0.00
Norway spruce	19.59	53.61	14.43	12.37	0.00	0.00	0.00	0.00	0.00
Blue spruce	1.06	81.91	17.02	0.00	0.00	0.00	0.00	0.00	0.00
Callery pear	0.00	25.00	55.43	16.30	3.26	0.00	0.00	0.00	0.00
White ash	1.14	9.09	28.41	29.55	20.45	9.09	2.27	0.00	0.00
Northern red oak	37.65	9.41	21.18	14.12	5.88	4.71	1.18	3.53	2.35
Citywide Total	6.58	24.43	38.44	16.58	7.52	2.94	1.84	0.80	0.87

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



Appendix Five- Town of Fishers

Land Use of Public Trees by Zone			
4/8/2014			
Land Use	Tree Count	% of Zone	% of Public Trees
Single family residential	53	1.77	1.77
Multi-family residential	88	2.94	2.94
Small commercial	91	3.04	3.04
Industrial/Large commercial	375	12.53	12.53
Park/vacant/other	2385	79.71	79.71
Total	2992	100.00	100.00

Appendix Six- Town Of Fishers

Average Annual Benefits of Public Trees by Species (\$/tree)

Species	Energy	CO2	Air Quality	Stormwater	Aesthetic/ Other	Total
Green ash	6.97	1.14	2.38	18.04	35.49	64.03
Red maple	3.24	0.42	1.04	8.16	34.26	47.13
Honeylocust	4.75	1.04	2.54	19.48	37.28	65.08
Black walnut	3.86	0.99	2.07	16.03	32.90	55.85
Sugar maple	4.89	0.74	1.54	14.51	37.84	59.52
Norway spruce	0.34	0.10	0.26	4.21	18.44	23.34
Blue spruce	0.17	0.07	0.18	3.44	19.26	23.12
Callery pear	2.32	0.34	0.88	6.35	10.69	20.59
White ash	7.02	1.22	2.40	21.62	32.51	64.77
Northern red oak	5.44	1.19	1.74	16.82	39.73	64.91
Northern hackberry	6.72	1.25	2.61	25.13	55.49	91.20
Black cherry	7.46	1.20	2.54	19.25	36.32	66.78
Eastern white pine	0.77	0.19	0.70	8.31	19.35	29.32
Eastern serviceberry	1.37	0.22	0.77	5.94	12.04	20.35
Eastern redbud	1.75	0.29	1.00	7.84	9.48	20.36
Apple	2.66	0.44	0.88	5.31	13.98	23.27
Austrian pine	0.93	0.31	0.84	9.68	23.36	35.12
River birch	5.24	0.85	1.83	14.18	28.79	50.90
Littleleaf linden	0.93	0.16	0.36	2.74	15.20	19.40
American elm	1.73	0.63	0.85	8.47	61.22	72.90
Hawthorn	1.84	0.32	1.06	8.29	9.38	20.90
Juniper	0.55	0.21	0.54	7.46	23.49	32.25
Hornbeam 'Fastigiata'	0.62	0.11	0.23	1.81	12.90	15.66
Bitternut hickory	7.04	1.15	2.40	17.87	37.22	65.68

Appendix Six- Town Of Fishers (Continued)

Average Annual Benefits of Public Trees by Species (\$/tree)

Species	Energy	CO2	Air Quality	Stormwater	Aesthetic/ Other	Total
Pin oak	8.14	1.90	2.59	25.93	44.45	83.02
Tulip tree	0.66	0.19	0.26	1.76	18.25	21.12
Slippery elm	3.67	1.02	1.65	15.96	55.03	77.33
Japanese zelkova	1.01	0.32	0.44	2.91	26.07	30.75
Mulberry	9.58	1.15	3.31	35.34	39.33	88.72
Northern white cedar	0.91	0.30	0.78	9.54	20.49	32.03
White oak	0.60	0.15	0.20	1.52	31.68	34.16
Norway maple	3.55	0.48	1.21	10.73	29.62	45.59
Silver maple	11.22	1.95	3.84	40.08	31.02	88.11
Amur maple	3.58	0.47	1.16	8.98	36.10	50.29
Eastern cottonwood	7.91	0.92	1.90	28.04	48.57	87.34
Bur oak	5.59	1.24	1.78	17.79	40.08	66.47
Magnolia	1.71	0.30	0.98	7.65	10.32	20.95
Shagbark hickory	7.17	1.23	2.44	18.65	37.05	66.54
Lilac	1.11	0.20	0.61	4.77	14.59	21.29
American sycamore	14.84	1.00	5.11	42.27	5.90	69.11
Black locust	4.40	0.83	1.51	10.90	34.00	51.64
Green hawthorn	0.85	0.14	0.46	3.60	16.22	21.28
Eastern red cedar	0.98	0.26	0.69	8.41	18.95	29.28
Maple	0.20	0.03	0.05	0.37	17.34	17.98
Sweetgum	3.09	0.65	1.09	7.31	34.42	46.56
English oak	16.35	2.63	5.08	60.41	46.00	130.46
Ginkgo	0.13	0.06	0.05	0.37	12.17	12.77
Boxelder	7.26	0.73	2.37	21.34	33.70	65.40
Eastern hemlock	0.40	0.05	0.17	1.45	9.17	11.24
Kentucky coffeetree	0.13	0.06	0.05	0.37	12.17	12.77
Pignut hickory	10.07	1.56	3.41	27.41	33.11	75.56
European beech	3.19	0.67	1.12	7.53	34.84	47.35
Willow	4.07	0.54	1.50	11.33	22.52	39.95
Dogwood	1.28	0.21	0.72	5.64	12.85	20.70
Baldcypress	0.13	0.06	0.05	0.37	12.17	12.77
Japanese maple	4.70	0.59	1.52	12.45	37.23	56.48
Siberian elm	11.07	1.54	4.61	44.20	40.24	101.67
American beech	8.61	1.12	2.98	23.59	25.02	61.32
American basswood	1.69	0.39	0.61	4.12	25.33	32.14
Swamp white oak	2.48	0.58	0.81	6.27	36.05	46.19
Higan cherry	1.70	0.33	0.97	7.61	11.15	21.77
White spruce	0.30	0.16	0.37	6.66	16.67	24.18
Northern catalpa	7.60	0.79	2.67	25.27	12.33	48.67
Plum	1.70	0.33	0.97	7.61	11.15	21.77
Flowering dogwood	0.33	0.03	0.11	0.46	18.51	19.43
Citywide Total	4.18	0.73	1.57	13.18	30.24	49.91

Appendix Seven- Town of Fishers

Structural (Woody) Condition of Public Trees by Zone

Condition	Tree Count	% of Public Trees
Dead or Dying	818	27.34
Poor	318	10.63
Fair	1684	56.28
Good	172	5.75
Total	2992	100.00

Appendix Eight- Town of Fishers

Structural (Woody) Condition of Public Trees by Species

Species	Condition	Tree Count	% of Species	% of Public Trees
American basswood	Dead or Dying	1	33.33	0.03
	Poor	0	0.00	0.00
	Fair	2	66.67	0.07
	Good	0	0.00	0.00
	Total	3	100.00	0.10
American beech	Dead or Dying	0	0.00	0.00
	Poor	0	0.00	0.00
	Fair	2	66.67	0.07
	Good	1	33.33	0.03
	Total	3	100.00	0.10
American elm	Dead or Dying	6	11.54	0.20
	Poor	1	1.92	0.03
	Fair	26	50.00	0.87
	Good	19	36.54	0.64
	Total	52	100.00	1.74
American sycamore	Dead or Dying	3	33.33	0.10
	Poor	2	22.22	0.07
	Fair	4	44.44	0.13
	Good	0	0.00	0.00
	Total	9	100.00	0.30

Appendix Eight- Town of Fishers

Structural (Woody) Condition of Public Trees by Species

Species	Condition	Tree Count	% of Species	% of Public Trees
Amur maple	Dead or Dying	0	0.00	0.00
	Poor	2	15.38	0.07
	Fair	11	84.62	0.37
	Good	0	0.00	0.00
	Total	13	100.00	0.43
Apple	Dead or Dying	4	6.15	0.13
	Poor	5	7.69	0.17
	Fair	51	78.46	1.70
	Good	5	7.69	0.17
	Total	65	100.00	2.17
Austrian pine	Dead or Dying	0	0.00	0.00
	Poor	1	1.61	0.03
	Fair	61	98.39	2.04
	Good	0	0.00	0.00
	Total	62	100.00	2.07
Baldcypress	Dead or Dying	0	0.00	0.00
	Poor	0	0.00	0.00
	Fair	4	100.00	0.13
	Good	0	0.00	0.00
	Total	4	100.00	0.13
Bitternut hickory	Dead or Dying	7	19.44	0.23
	Poor	5	13.89	0.17
	Fair	24	66.67	0.80
	Good	0	0.00	0.00
	Total	36	100.00	1.20
Black cherry	Dead or Dying	23	28.05	0.77
	Poor	43	52.44	1.44
	Fair	15	18.29	0.50
	Good	1	1.22	0.03
	Total	82	100.00	2.74
Black locust	Dead or Dying	3	33.33	0.10
	Poor	1	11.11	0.03
	Fair	5	55.56	0.17
	Good	0	0.00	0.00
	Total	9	100.00	0.30

Appendix Eight- Town of Fishers

Structural (Woody) Condition of Public Trees by Species

Species	Condition	Tree Count	% of Species	% of Public Trees
Black walnut	Dead or Dying	0	0.00	0.00
	Poor	11	9.48	0.37
	Fair	102	87.93	3.41
	Good	3	2.59	0.10
	Total	116	100.00	3.88
Blue spruce	Dead or Dying	3	3.19	0.10
	Poor	2	2.13	0.07
	Fair	86	91.49	2.87
	Good	3	3.19	0.10
	Total	94	100.00	3.14
Boxelder	Dead or Dying	3	42.86	0.10
	Poor	3	42.86	0.10
	Fair	1	14.29	0.03
	Good	0	0.00	0.00
	Total	7	100.00	0.23
Bur oak	Dead or Dying	0	0.00	0.00
	Poor	1	8.33	0.03
	Fair	8	66.67	0.27
	Good	3	25.00	0.10
	Total	12	100.00	0.40
Callery pear	Dead or Dying	0	0.00	0.00
	Poor	17	18.48	0.57
	Fair	73	79.35	2.44
	Good	2	2.17	0.07
	Total	92	100.00	3.07
Dogwood	Dead or Dying	0	0.00	0.00
	Poor	0	0.00	0.00
	Fair	3	75.00	0.10
	Good	1	25.00	0.03
	Total	4	100.00	0.13
Eastern cottonwood	Dead or Dying	10	76.92	0.33
	Poor	1	7.69	0.03
	Fair	2	15.38	0.07
	Good	0	0.00	0.00
	Total	13	100.00	0.43

Appendix Eight- Town of Fishers

Structural (Woody) Condition of Public Trees by Species

Species	Condition	Tree Count	% of Species	% of Public Trees
Eastern hemlock	Dead or Dying	0	0.00	0.00
	Poor	1	20.00	0.03
	Fair	3	60.00	0.10
	Good	1	20.00	0.03
	Total	5	100.00	0.17
Eastern red cedar	Dead or Dying	0	0.00	0.00
	Poor	1	11.11	0.03
	Fair	7	77.78	0.23
	Good	1	11.11	0.03
	Total	9	100.00	0.30
Eastern redbud	Dead or Dying	6	8.57	0.20
	Poor	12	17.14	0.40
	Fair	51	72.86	1.70
	Good	1	1.43	0.03
	Total	70	100.00	2.34
Eastern serviceberry	Dead or Dying	0	0.00	0.00
	Poor	3	4.23	0.10
	Fair	61	85.92	2.04
	Good	7	9.86	0.23
	Total	71	100.00	2.37
Eastern white pine	Dead or Dying	10	12.35	0.33
	Poor	2	2.47	0.07
	Fair	69	85.19	2.31
	Good	0	0.00	0.00
	Total	81	100.00	2.71
English oak	Dead or Dying	2	28.57	0.07
	Poor	2	28.57	0.07
	Fair	3	42.86	0.10
	Good	0	0.00	0.00
	Total	7	100.00	0.23
European beech	Dead or Dying	1	25.00	0.03
	Poor	0	0.00	0.00
	Fair	2	50.00	0.07
	Good	1	25.00	0.03
	Total	4	100.00	0.13

Appendix Eight- Town of Fishers

Structural (Woody) Condition of Public Trees by Species

Species	Condition	Tree Count	% of Species	% of Public Trees
Flowering dogwood	Dead or Dying	0	0.00	0.00
	Poor	1	100.00	0.03
	Fair	0	0.00	0.00
	Good	0	0.00	0.00
	Total	1	100.00	0.03
Ginkgo	Dead or Dying	0	0.00	0.00
	Poor	2	28.57	0.07
	Fair	5	71.43	0.17
	Good	0	0.00	0.00
	Total	7	100.00	0.23
Green ash	Dead or Dying	581	97.81	19.42
	Poor	8	1.35	0.27
	Fair	5	0.84	0.17
	Good	0	0.00	0.00
	Total	594	100.00	19.85
Green hawthorn	Dead or Dying	0	0.00	0.00
	Poor	0	0.00	0.00
	Fair	9	100.00	0.30
	Good	0	0.00	0.00
	Total	9	100.00	0.30
Hawthorn	Dead or Dying	1	2.04	0.03
	Poor	4	8.16	0.13
	Fair	28	57.14	0.94
	Good	16	32.65	0.53
	Total	49	100.00	1.64
Higan cherry	Dead or Dying	0	0.00	0.00
	Poor	1	50.00	0.03
	Fair	1	50.00	0.03
	Good	0	0.00	0.00
	Total	2	100.00	0.07
Honeylocust	Dead or Dying	5	3.27	0.17
	Poor	15	9.80	0.50
	Fair	133	86.93	4.45
	Good	0	0.00	0.00
	Total	153	100.00	5.11

Appendix Eight- Town of Fishers

Structural (Woody) Condition of Public Trees by Species

Species	Condition	Tree Count	% of Species	% of Public Trees
European Hornbeam	Dead or Dying	0	0.00	0.00
	Poor	6	16.67	0.20
	Fair	30	83.33	1.00
	Good	0	0.00	0.00
	Total	36	100.00	1.20
Japanese maple	Dead or Dying	0	0.00	0.00
	Poor	0	0.00	0.00
	Fair	1	33.33	0.03
	Good	2	66.67	0.07
	Total	3	100.00	0.10
Japanese zelkova	Dead or Dying	0	0.00	0.00
	Poor	0	0.00	0.00
	Fair	24	100.00	0.80
	Good	0	0.00	0.00
	Total	24	100.00	0.80
Juniper	Dead or Dying	0	0.00	0.00
	Poor	0	0.00	0.00
	Fair	37	100.00	1.24
	Good	0	0.00	0.00
	Total	37	100.00	1.24
Kentucky coffeetree	Dead or Dying	0	0.00	0.00
	Poor	0	0.00	0.00
	Fair	4	100.00	0.13
	Good	0	0.00	0.00
	Total	4	100.00	0.13
Japanese Lilac	Dead or Dying	0	0.00	0.00
	Poor	0	0.00	0.00
	Fair	0	0.00	0.00
	Good	11	100.00	0.37
	Total	11	100.00	0.37
Littleleaf linden	Dead or Dying	0	0.00	0.00
	Poor	11	19.30	0.37
	Fair	44	77.19	1.47
	Good	2	3.51	0.07
	Total	57	100.00	1.91

Appendix Eight- Town of Fishers

Structural (Woody) Condition of Public Trees by Species

Species	Condition	Tree Count	% of Species	% of Public Trees
Magnolia	Dead or Dying	0	0.00	0.00
	Poor	2	16.67	0.07
	Fair	10	83.33	0.33
	Good	0	0.00	0.00
	Total	12	100.00	0.40
Paperpark Maple	Dead or Dying	1	12.50	0.03
	Poor	0	0.00	0.00
	Fair	7	87.50	0.23
	Good	0	0.00	0.00
	Total	8	100.00	0.27
Mulberry	Dead or Dying	3	12.50	0.10
	Poor	16	66.67	0.53
	Fair	5	20.83	0.17
	Good	0	0.00	0.00
	Total	24	100.00	0.80
Northern catalpa	Dead or Dying	0	0.00	0.00
	Poor	0	0.00	0.00
	Fair	1	100.00	0.03
	Good	0	0.00	0.00
	Total	1	100.00	0.03
Northern hackberry	Dead or Dying	2	2.44	0.07
	Poor	11	13.41	0.37
	Fair	67	81.71	2.24
	Good	2	2.44	0.07
	Total	82	100.00	2.74
Northern red oak	Dead or Dying	4	4.71	0.13
	Poor	9	10.59	0.30
	Fair	71	83.53	2.37
	Good	1	1.18	0.03
	Total	85	100.00	2.84
Northern white cedar	Dead or Dying	0	0.00	0.00
	Poor	0	0.00	0.00
	Fair	7	30.43	0.23
	Good	16	69.57	0.53
	Total	23	100.00	0.77

Appendix Eight- Town of Fishers

Structural (Woody) Condition of Public Trees by Species

Species	Condition	Tree Count	% of Species	% of Public Trees
Norway maple	Dead or Dying	2	11.76	0.07
	Poor	1	5.88	0.03
	Fair	14	82.35	0.47
	Good	0	0.00	0.00
	Total	17	100.00	0.57
Norway spruce	Dead or Dying	4	4.12	0.13
	Poor	12	12.37	0.40
	Fair	80	82.47	2.67
	Good	1	1.03	0.03
	Total	97	100.00	3.24
Pignut hickory	Dead or Dying	1	25.00	0.03
	Poor	1	25.00	0.03
	Fair	2	50.00	0.07
	Good	0	0.00	0.00
	Total	4	100.00	0.13
Pin oak	Dead or Dying	3	10.00	0.10
	Poor	2	6.67	0.07
	Fair	24	80.00	0.80
	Good	1	3.33	0.03
	Total	30	100.00	1.00
Plum	Dead or Dying	0	0.00	0.00
	Poor	0	0.00	0.00
	Fair	1	100.00	0.03
	Good	0	0.00	0.00
	Total	1	100.00	0.03
Red maple	Dead or Dying	11	3.31	0.37
	Poor	65	19.58	2.17
	Fair	208	62.65	6.95
	Good	48	14.46	1.60
	Total	332	100.00	11.10
River birch	Dead or Dying	0	0.00	0.00
	Poor	4	6.90	0.13
	Fair	49	84.48	1.64
	Good	5	8.62	0.17
	Total	58	100.00	1.94

Appendix Eight- Town of Fishers

Structural (Woody) Condition of Public Trees by Species

Species	Condition	Tree Count	% of Species	% of Public Trees
Shagbark hickory	Dead or Dying	1	9.09	0.03
	Poor	2	18.18	0.07
	Fair	6	54.55	0.20
	Good	2	18.18	0.07
	Total	11	100.00	0.37
Siberian elm	Dead or Dying	0	0.00	0.00
	Poor	1	33.33	0.03
	Fair	2	66.67	0.07
	Good	0	0.00	0.00
	Total	3	100.00	0.10
Silver maple	Dead or Dying	1	6.67	0.03
	Poor	6	40.00	0.20
	Fair	8	53.33	0.27
	Good	0	0.00	0.00
	Total	15	100.00	0.50
Slippery elm	Dead or Dying	18	69.23	0.60
	Poor	1	3.85	0.03
	Fair	4	15.38	0.13
	Good	3	11.54	0.10
	Total	26	100.00	0.87
Sugar maple	Dead or Dying	8	7.77	0.27
	Poor	14	13.59	0.47
	Fair	74	71.84	2.47
	Good	7	6.80	0.23
	Total	103	100.00	3.44
Swamp white oak	Dead or Dying	0	0.00	0.00
	Poor	0	0.00	0.00
	Fair	2	100.00	0.07
	Good	0	0.00	0.00
	Total	2	100.00	0.07
Sweetgum	Dead or Dying	0	0.00	0.00
	Poor	0	0.00	0.00
	Fair	3	42.86	0.10
	Good	4	57.14	0.13
	Total	7	100.00	0.23

Appendix Eight- Town of Fishers				
Structural (Woody) Condition of Public Trees by Species				
Species	Condition	Tree Count	% of Species	% of Public Trees
Tulip tree	Dead or Dying	3	10.34	0.10
	Poor	4	13.79	0.13
	Fair	22	75.86	0.74
	Good	0	0.00	0.00
	Total	29	100.00	0.97
White ash	Dead or Dying	87	98.86	2.91
	Poor	0	0.00	0.00
	Fair	1	1.14	0.03
	Good	0	0.00	0.00
	Total	88	100.00	2.94
White oak	Dead or Dying	0	0.00	0.00
	Poor	2	10.53	0.07
	Fair	16	84.21	0.53
	Good	1	5.26	0.03
	Total	19	100.00	0.64
White spruce	Dead or Dying	0	0.00	0.00
	Poor	0	0.00	0.00
	Fair	0	0.00	0.00
	Good	1	100.00	0.03
	Total	1	100.00	0.03
Willow	Dead or Dying	0	0.00	0.00
	Poor	1	25.00	0.03
	Fair	3	75.00	0.10
	Good	0	0.00	0.00
	Total	4	100.00	0.13