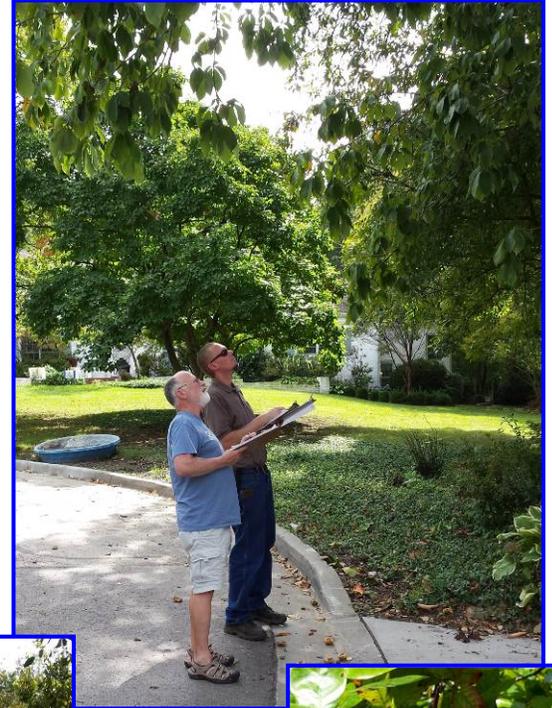


COMMUNITY FORESTRY PROGRAM CITY OF FAIRWAY, KANSAS

INVENTORY RESULTS AND MANAGEMENT RECOMMENDATIONS September 2017



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EXECUTIVE SUMMARY

The community forest of Fairway represents a considerable economic and environmental asset to city residents and visitors. The inventory analysis and management recommendation that follows is the result of a 100% inventory of street, park, greenspace, and Shawnee Indian Mission properties. At the time of the inventory, 2,564 trees were found on Fairway public properties, estimated in value to be more than \$8.9 million. Seventy-six species of trees are growing on public properties, with three species at or more than the recommended levels for stocking. These three species comprise 47% of the total population of public trees. Red maple populations have increased so with sugar maple, silver maple, and red maple comprising 23% of the total population, care should be taken control populations of maple, a highly-favored species of the Asian longhorned beetle. Pin oak and northern red oak alone comprise 28% of the total population, as well. Condition ratings indicate a community forest that is aging and has deteriorated from storms, drought, and other environmental influences. Thirty-three percent of trees require little or no corrective work, 46% need some corrective pruning or repair, 20% require major repair, renovation, or replacement and 1% of trees were dead or dying and have since been removed. The average diameter of Fairway's public trees shows a resource that is more mature than juvenile. It is encouraging that 62% of trees are in the diameter categories less than 20" and the trend of planting and establishing a significant number of trees each year should continue with the anticipated loss of more than 20% of trees in the next 15 years. With several trees at or nearing an overmature size and several young trees being planted and establishing, it is all-the-more important to continue with the annual pruning cycle that the city has followed for years and continue a progressive planting program that diversifies the community forest.

Not only are Fairway's public trees valuable from a landscape standpoint, they provide \$598,204 in annual ecosystem services. It's easier to see the aesthetic value of these community trees, but with news of ground-level ozone exceeding thresholds, global warming, cities monitoring their stormwater discharges, and rising utility costs, there is now science-based data proving that community trees belong in a city's toolbox for addressing environmental and economic concerns and issues. By protecting against the harshness of an urban environment, healthy tree canopies make a difference between an unhealthy city and one where human health and well-being are bolstered.

The development of goals and objectives and annual plans of work will enhance the community forest in Fairway. Examples of goals are: 1) increase species diversity; 2) increase the number of good condition trees while reducing the number of fair, poor, and dead/dying trees; 3) diversify funding opportunities by engaging charitable and civic organizations, commercial interests, and community members, or 4) plant historically-appropriate and desirable species at the Shawnee Indian Mission to replace the less desirable species that currently exist. Annual plans of work could be developed for individual properties, such as the city park, the Shawnee Indian Mission, the multiple greenspaces, and even individual street quadrants.

This inventory analysis and management recommendation highlights resource trends and management needs that can guide the development of realistic budgetary forecasts and long-term management that, over time, will benefit all who live in or visit Fairway.

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INTRODUCTION

A 100% inventory of street, park, and greenspace trees and trees at the Shawnee Indian Mission was conducted September 2017 within the city limits of Fairway. This is the second public tree inventory for the city. In this inventory, all publicly-owned trees were recorded as to their species, size, and condition class, defined as:

GOOD: Healthy vigorous tree with no apparent signs of disease or mechanical injury. The tree is representative of its species and requires little or no corrective work.

FAIR: Tree of average condition and vigor for the area, with minor insect injury, disease or physiological problems. May lack desirable form characteristics of the species, and may require some corrective pruning or repair.

POOR: Tree is in general state of decline and may show severe mechanical, insect or disease damage, but death is not imminent. May require major repair, renovation, or replacement.

DEAD/DYING: Dead or death imminent from Dutch elm disease, emerald ash borer, drought, or other causes.

Grateful acknowledgment is given to Ky Weekly, Fairway Tree Board, and City of Fairway staff: Bill Stogsdill, Brice Soeken, Rick Allen, Chris Mann, Abbie Aldridge, and Amber Fey for their assistance and support in the completion of this project.

The purpose of this report is to provide information to the City of Fairway to aid in the continued development of a community forestry planting and management program. Ideally, a program should include:

1. A mission statement.
2. Goals developed on the mission statement that target specific problem areas. Goals could be to implement an annual planting program, increase species diversity in the city, or develop specific plans for high use areas.
3. Objectives based upon the goals. Objectives should contain 4 components: (1) *results* to be achieved, (2) *criteria* by which results will be measured (often a number or percent), (3) *time frame* for completing the objective, and (4) *specific target* for which the objective is directed.
4. An annual plan of work, developed from the objectives, should include the activities, projects, and budget request.

The appendices of this report contain information relevant to the selection, planting and care of trees. This information is included in support of this report as well as with future technical needs. The report binder is broken down into the following subject areas: Inventory Results, Tree Value, Species Composition, Condition Classes, and General Recommendations.



A community forestry program should address management of the public tree resource.



Healthy trees may be the first opportunity to provide a favorable impression to Fairway citizens and visitors.



Well-trained city staff and tree board members should monitor and address trees in poor or declining health.

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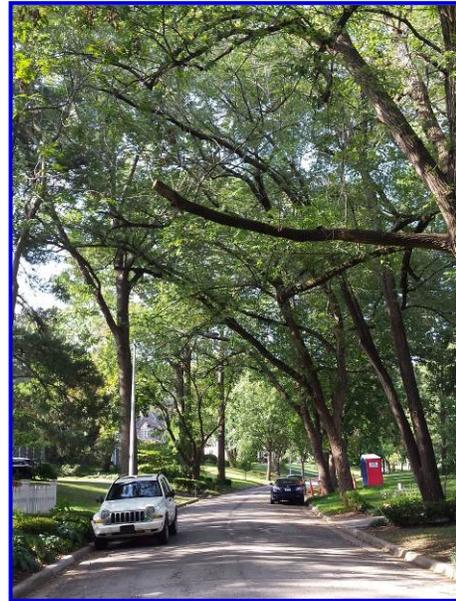
INVENTORY RESULTS

At the time of the inventory, there were 2,564 publicly-owned trees within the city limits of Fairway, representing approximately 76 different species. Street trees included all trees in the right of way or those substantially influencing the right of way. Park trees included those in Fairway City Park. Greenspace trees are those in open spaces owned by the city. North and south parcels of the Shawnee Indian Mission were included. Pin oak comprises 26% of the total population with sugar maple at 12% of the total. Sweetgum follows at 9% and red maple at 6% of the population.

In the Fairway area, where a large variety of tree species will grow well, no single species should comprise more than 10% of the total number of trees, with some now recommending no more than 5% per species. Overpopulation by a single species can make a community vulnerable to losing a large number of trees to a single insect or disease. Dutch elm disease in American elms and the emerald ash borer in ash are examples. Pin oak and sugar maple are over the recommended 10% stocking rate and should not be planted in the future. Sweetgum and red maple are approaching the 10% level and careful consideration should be taken regarding increasing the population of these species.

The condition and health of the species is an important consideration. At the time of the inventory, the summarized field data shows that 33% of all trees are reported to be in good condition, followed by 46% in fair, and 20% in poor condition. Approximately 27(1%) dead and dying trees were identified. This is somewhat of a similar breakdown of what we would find in many Kansas communities with a managing tree program. Such categories help to easily identify future management needs. For example, based on the breakdown of condition classes, 33% (837 trees) have no specific management needs, 46% (1190 trees) require minor pruning, maintenance, or insect and disease controls, and 20% (510 trees) require more intensive management intervention. All dead and dying trees should be removed as quickly as is possible.

NOTE: In the time since the inventory, all dead and dying trees have been removed. This action is commendable.

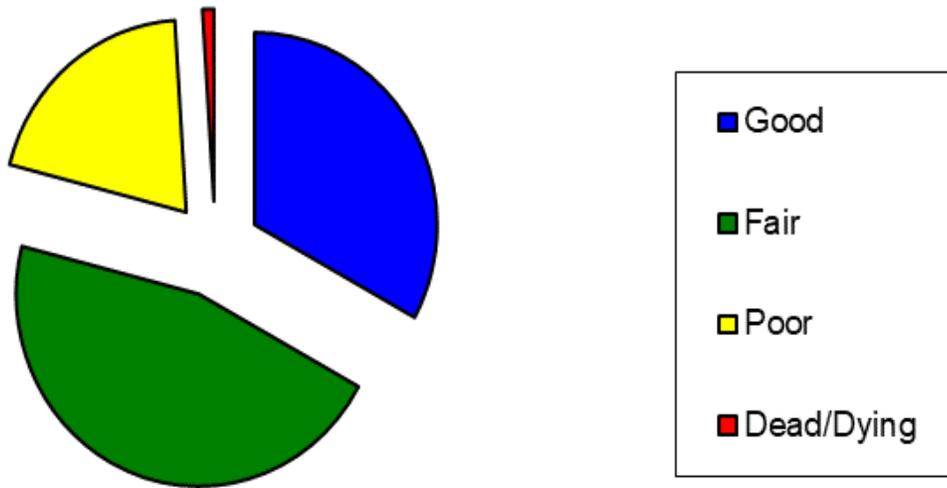


Healthy trees provide many benefits for the entire community, such as improved water and air quality, carbon dioxide storage, energy savings, and aesthetic value.

Pin oak and northern red oak alone comprise 28% of the total population. Sugar, silver and red maple comprise 23% of the total population - more than the recommended level of 20% for any genera. Recommendations have been that no one family exceed 30% of the total population but some currently questions the 10-20-30 Rule, suggesting that stocking levels should be much lower per species, genera, and family.

Some tree insects and pests don't attack an entire genera or family, but as emerald ash borer has shown, all *Fraxinus* in this country are vulnerable, as might be other members of the Olive family. Asian longhorned beetle favors maple, buckeye, willow, and elm plus numerous other tree species that are good or occasional hosts.

2017 Condition Classes by Percent



GOOD: Healthy vigorous tree with no apparent signs of disease or mechanical injury. The tree is representative of its species and requires little or no corrective work.

FAIR: Tree of average condition and vigor for the area, with minor insect, injury, disease or physiological problems. May lack desirable form characteristics of the specie and may require some corrective pruning or repair.

POOR: Tree is in general state of decline, and may show severe mechanical, insect or disease damage, but death is no imminent. May require major repair, renovation or replacement.

DEAD/DYING: Dead or death imminent from Dutch elm disease, emerald ash borer, drought, or other causes.

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TREE VALUE

Trees provide many services to the community and ecosystem. Trees add beauty and create an environment beneficial to our well-being by:

- Adding and defining natural character to our cities and towns.
- Providing us with colors, flowers, forms and textures.
- Screening undesirable views and softening the harsh lines of masonry, metal and glass.
- Reduce and cut noise pollution by acting as sound barriers.
- Defining space and providing landscape interest and continuity.

Direct and measurable benefits of trees are also very significant. Properly selected and planted trees can:

- Reduce air pollution by trapping and holding particulate pollutants and absorbing carbon dioxide and other dangerous gasses.
- Conserve water and reduce soil erosion.
- Save energy by reducing glare and providing cooling shade in the sunny hotter months and windbreaks during the cold winter months.
- Increase property values from 7% to 15%.

The value figures in the following tables were computed using an equation developed by the International Shade Tree Conference which takes into consideration intrinsic values such as shade and beauty. The estimated value of all inventoried trees within Fairway city limits is more than \$8.9 million dollars.

The above figure is used only as an estimate based on currently accepted calculations. Inventory values and data are pertinent to the determination of adequate yearly budget levels needed to maintain and enhance the public tree resource.



Trees add measurable values to our communities

The 2017 value of inventoried street, park, greenspace and Shawnee Indian Mission trees in Fairway is \$8,981,957.

Trees provide many ecosystem services that can now be quantified through i-Tree Streets, a street tree resource analysis tool for community forest managers. See Appendix A for specific ecosystem services and other benefits provided by Fairway's public trees.

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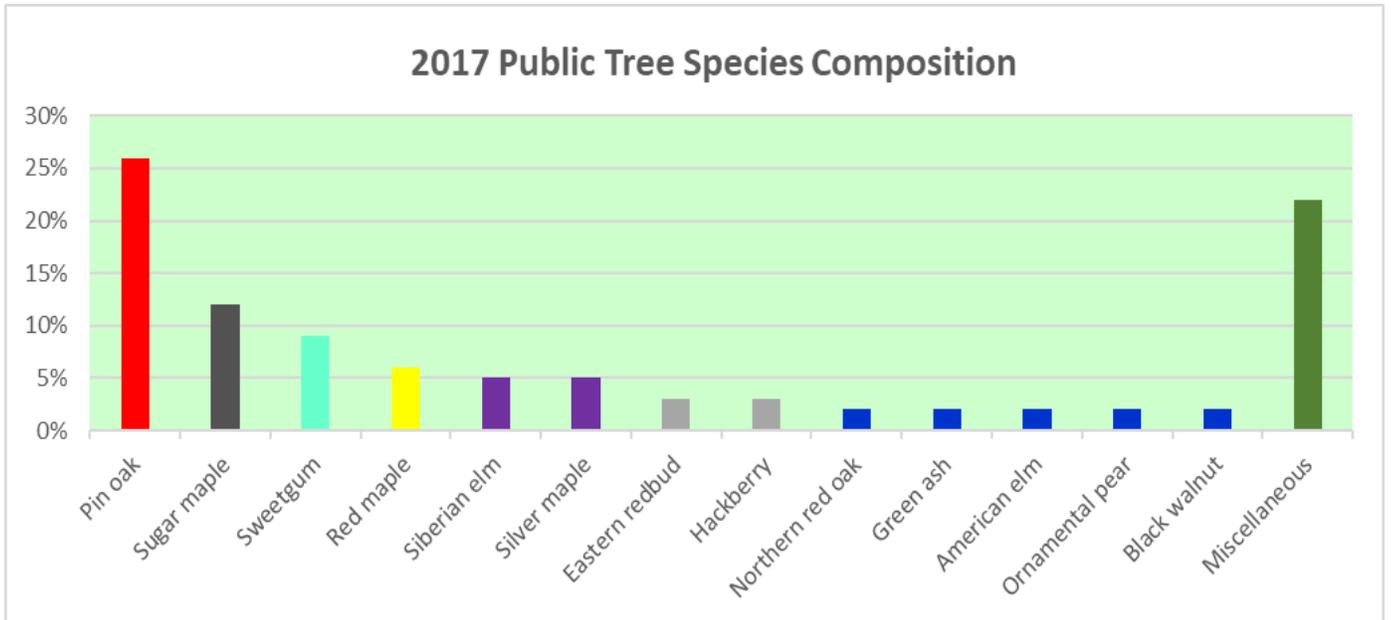
PUBLIC TREE RESOURCE - City of Fairway, Kansas September 2017 Percent of Inventory Total

SPECIES	No. of Trees	Avg. Dia.	% Good	% Fair	% Poor	% Dead & Dying	% of Total Trees	Value
Pin oak	662	29"	21%	69%	10%	0%	26%	\$4,863,470
Sugar maple	300	14"	44%	36%	19%	0%	12%	\$726,682
Sweetgum	242	20"	37%	50%	14%	0%	9%	\$1,072,346
Red maple	164	12"	56%	35%	9%	1%	6%	\$100,793
Siberian elm	126	26"	1%	37%	62%	1%	5%	\$127,715
Silver maple	124	24"	11%	48%	40%	1%	5%	\$208,184
Eastern redbud	67	5"	55%	27%	15%	3%	3%	\$17,962
Hackberry	65	20"	14%	62%	23%	2%	3%	\$155,151
Northern red oak	63	16"	70%	22%	8%	0%	2%	\$237,826
Green ash	53	20"	19%	55%	17%	8%	2%	\$101,319
American elm	47	24"	11%	43%	43%	4%	2%	\$108,985
Ornamental pear	39	12"	13%	59%	28%	0%	2%	\$40,648
Black walnut	39	22"	13%	51 %	36%	0%	2%	\$160,110
Miscellaneous*	573	12"	44%	31%	23%	2%	22%	\$1,060,766
TOTAL	2564	19"	33%	46%	20%	1%	100%	\$8,981,957

***Miscellaneous:** (Tree species that represent 1% or less of the total inventoried public tree population): Arborvitae, white ash, baldcypress, tricolor beech; river and eastern white birch; boxelder, Ohio buckeye, northern catalpa; black and ornamental cherry; common chokecherry, Kentucky coffeetree, crabapple, flowering dogwood, fruit species, Ginkgo, goldenraintree, eastern hemlock, shagbark hickory, honeylocust, European hornbeam, juniper, Japanese tree lilac; American and littleleaf linden; black locust, magnolia; amur, freeman, Japanese, Norway, and trident maple; mimosa, mulberry; bur, chestnut, chinkapin, English, shingle, swamp white, and willow oak; Osage-orange; Austrian, eastern white, limber, and Scotch pine; London planetree, purpleleaf plum, eastern redcedar, serviceberry, common smoketree; Black Hills, Colorado blue, and Norway spruce; staghorn sumac, American sycamore, tuliptree, black tupelo, Viburnum, willow, American yellowwood, and Japanese zelkova.

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***Miscellaneous:** (Tree species that represent 1% or less of the total inventoried public tree population): Arborvitae, white ash, baldcypress, tricolor beech; river and eastern white birch; boxelder, Ohio buckeye, northern catalpa; black and ornamental cherry; common chokecherry, Kentucky coffeetree, crabapple, flowering dogwood, fruit species, Ginkgo, goldenrain tree, eastern hemlock, shagbark hickory, honeylocust, European hornbeam, juniper, Japanese tree lilac; American and littleleaf linden; black locust, magnolia; amur, freeman, Japanese, Norway, and trident maple; mimosa, mulberry; bur, chestnut, chinkapin, English, shingle, swamp white, and willow oak; Osage-orange; Austrian, eastern white, limber, and Scotch pine; London planetree, purpleleaf plum, eastern redcedar, serviceberry, common smoketree; Black Hills, Colorado blue, and Norway spruce; staghorn sumac, American sycamore, tuliptree, black tupelo, Viburnum, willow, American yellowwood, and Japanese zelkova.

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WARD 1 TREE RESOURCE - City of Fairway, Kansas September 2017 Percent of Inventory Total

SPECIES	No. of Trees	Avg. Dia.	% Good	% Fair	% Poor	% Dead & Dying	% of Total Trees	Value
Sugar maple	139	14"	41%	38%	21%	0%	25%	\$291,730
Sweetgum	121	21"	23%	67%	10%	0%	21%	\$519,647
Pin oak	74	29"	26%	69%	5%	0%	13%	\$558,991
Red maple	55	12"	58%	38%	4%	0%	10%	\$35,446
Siberian elm	21	28"	0%	24%	76%	0%	4%	\$21,855
Northern red oak	16	11"	75%	19%	6%	0%	3%	\$28,428
White ash	11	24"	27%	36%	36%	0%	2%	\$32,122
American elm	11	29"	0%	54%	46%	0%	2%	\$28,319
Serviceberry	11	2"	91%	9%	0%	0%	2%	\$512
Swamp white oak	9	10"	78%	22%	0%	0%	2%	\$14,783
Ornamental pear	9	13"	0%	89%	11%	0%	2%	\$12,174
Miscellaneous*	87	13"	45%	40%	14%	1%	%	\$194,843
TOTAL	564	17"	37%	48%	15%	0%	100%	\$1,738,850

***Miscellaneous:** (Tree species that represent 1% or less of the total inventoried Ward 1 tree population): Green ash, baldcypress, Tricolor beech, ornamental cherry, Kentucky coffeetree, crabapple, flowering dogwood, ginkgo, goldenraintree, European hornbeam; American and littleleaf linden; freeman, Japanese, Norway, silver, and trident maple; mulberry; chestnut, shingle, and willow oak; Austrian pine, London planetree, eastern redbud, eastern redcedar, Colorado blue spruce, American sycamore, tuliptree, black tupelo, and black walnut.

Ward 1 Overview:

Sugar maple, sweetgum, pin oak, and red maple exceed the recommended level of 10% for species diversity. As trees within these species decline and require removal, other species should be replanted in their place to increase the overall diversity of the city and especially of Ward 1. The pin oak's average diameter indicates that it is approaching an overmature size and issues related to age, storm damage, and other environmental stresses should be expected. Siberian elm, with an average diameter of 28", is very prone to storm damage and accelerated decline with age. American elm is approaching an overmature state and could yet be affected by Dutch elm disease. If not regularly treated, the remaining ash trees should be expected to be infested with the emerald ash borer.

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WARD 2 TREE RESOURCE - City of Fairway, Kansas September 2017 Percent of Inventory Total

SPECIES	No. of Trees	Avg. Dia.	% Good	% Fair	% Poor	% Dead & Dying	% of Total Trees	Value
Pin oak	151	28"	37%	47%	16%	0%	29%	\$1,089,171
Sweetgum	71	19"	52%	27%	21%	0%	13%	\$308,379
Sugar maple	58	15"	48%	26%	26%	0%	11%	\$162,010
Eastern redbud	22	5"	68%	14%	18%	0%	4%	\$6,931
Red maple	19	12"	58%	16%	26%	0%	4%	\$12,044
Hackberry	17	16"	0%	65%	35%	0%	3%	\$24,530
Siberian elm	16	22"	0%	25%	75%	0%	3%	\$10,341
Northern red oak	16	18"	69%	25%	6%	0%	3%	\$78,624
American elm	15	26"	7%	40%	47%	0%	3%	\$38,563
Silver maple	11	18"	36%	46%	18%	0%	2%	\$12,932
Ornamental pear	11	13"	9%	55%	36%	0%	2%	\$10,965
Eastern redcedar	10	6"	0%	0%	100%	0%	2%	\$1,450
Black walnut	10	19"	0%	40%	60%	0%	2%	\$22,228
Miscellaneous*	101	13"	54%	26%	19%	1%	19%	\$232,565
TOTAL	528	19"	42%	33%	25%	0%	100%	\$2,010,733

***Miscellaneous:** (Tree species that represent 1% or less of the total inventoried Ward 2 tree population): Arborvitae; green and white ash, baldcypress, eastern white birch, Ohio buckeye, crabapple, flowering dogwood, ginkgo, goldenraintree, shagbark hickory, honeylocust, juniper, littleleaf linden, black locust, magnolia; freeman, Japanese, Norway and trident maple, chinkapin, shingle, and swamp white oak; Austrian, eastern white, limber, and Scotch pine; American sycamore, tuliptree, American yellowwood, and Japanese zelkova.

Ward 2 Overview:

Pin oak, sweetgum and sugar maple are overly-abundant species in Ward 2. As trees within these species decline and require removal, other species should be replanted in their place to increase the overall diversity. This ward also is comprised of mature and overmature pin oak, Siberian elm and American elm and black walnut is nearing mature to overmature sizes. Large trees in the ward should be expected to have issues related to age, storm damage, accelerated decline, and environmental stresses. Some, or all, of the 3% American elm could be affected yet by Dutch elm disease and the pines by pine wilt. If not regularly treated, the remaining ash trees should be expected to be infested with the emerald ash borer.

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WARD 3 TREE RESOURCE - City of Fairway, Kansas September 2017 Percent of Inventory Total

SPECIES	No. of Trees	Avg. Dia.	% Good	% Fair	% Poor	% Dead & Dying	% of Total Trees	Value
Pin oak	377	30"	11%	82%	7%	0%	49%	\$2,785,420
Silver maple	64	27"	0%	51%	47%	2%	8%	\$111,180
Red maple	61	11"	62%	31%	5%	2%	8%	\$31,964
Sugar maple	41	16"	37%	42%	22%	0%	5%	\$108,532
Sweetgum	26	21"	50%	42%	8%	0%	3%	\$137,070
Juniper	22	6"	0%	0%	100%	0%	3%	\$3,190
Siberian elm	16	27"	0%	44%	56%	0%	2%	\$17,918
Northern red oak	15	14"	80%	13%	7%	0%	2%	\$45,763
Serviceberry	12	2"	83%	17%	0%	0%	2%	\$544
American sycamore	12	28"	83%	17%	0%	0%	2%	\$108,974
Miscellaneous*	126	14"	50%	32%	15%	3%	16%	\$248,803
TOTAL	772	23"	26%	57%	16%	1%	100%	\$3,599,358

***Miscellaneous:** (Tree species that represent 1% or less of the total inventoried Ward 3 tree population):
 Arborvitae; green and white ash, baldcypress; river and eastern white birch; Ohio buckeye, Kentucky coffeetree, crabapple, American elm, goldenrain tree, hackberry, honeylocust, littleleaf linden, magnolia; amur, freeman, Japanese, Norway, and trident maple; mulberry; bur, chinkapin, shingle, and swamp white oak; Osage-orange, ornamental pear; Austrian, eastern white, and Scotch pine; purpleleaf plum, eastern redbud, eastern redcedar, serviceberry, Colorado blue and Norway spruce, tuliptree, and black walnut.

Ward 3 Overview:

Pin oak utterly dominates the diversity in Ward 3 and is one of the largest species, to boot. The pin oak should be a specific management consideration for the ward. Silver maple and Siberian elm are prone to storm damage and accelerated decline, especially when in a mature to overmature state, and the sycamore should be monitored for damage and decline. There is a real need to identify the poorest condition trees, especially those also with large diameters, and target diverse plantings in anticipation of future loss. Maple comprises 23% of the ward population and should be discouraged for large-scale planting. If not regularly treated, the remaining ash trees should be expected to be infested with the emerald ash borer.

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WARD 4 TREE RESOURCE - City of Fairway, Kansas September 2017 Percent of Inventory Total

SPECIES	No. of Trees	Avg. Dia.	% Good	% Fair	% Poor	% Dead & Dying	% of Total Trees	Value
Siberian elm	70	26"	1%	44%	54%	1%	19%	\$75,631
Sugar maple	51	15"	53%	37%	8%	2%	14%	\$142,497
Pin oak	36	28"	47%	50%	3%	0%	10%	\$287,954
Silver maple	33	24"	12%	46%	42%	0%	9%	\$52,380
Red maple	21	12"	38%	48%	14%	0%	6%	\$11,530
Green ash	20	24"	20%	55%	25%	0%	5%	\$50,095
Sweetgum	19	20"	47%	37%	16%	0%	5%	\$86,350
Eastern redbud	17	5"	47%	41%	12%	0%	5%	\$4,117
American elm	11	18"	18%	18%	46%	18%	3%	\$16,109
Crabapple	10	5"	10%	20%	70%	0%	3%	\$1,701
Ornamental pear	10	9"	30%	60%	10%	0%	3%	\$8,417
Northern red oak	9	21"	78%	11%	11%	0%	2%	\$49,779
Flowering dogwood	8	6"	25%	38%	0%	38%	2%	\$1,181
Eastern redcedar	8	17"	0%	50%	50%	0%	2%	\$14,476
Scotch pine	7	10"	29%	14%	57%	0%	2%	\$1,721
Miscellaneous*	41	14"	39%	39%	17%	5%	11%	\$69,176
TOTAL	371	19"	30%	41%	27%	2%	100%	\$873,114

***Miscellaneous:** (Tree species that represent 1% or less of the total inventoried Ward 4 tree population): White ash, river birch, black and ornamental cherry, common chokecherry, fruit species, ginkgo, hackberry, honeylocust, littleleaf linden, black locust, magnolia; Norway maple, mimosa, mulberry, swamp white oak, Austrian and eastern white pine; Colorado blue and Norway spruce; American sycamore, tuliptree, black walnut, and willow.

Ward 4 Overview:

Two species prone to storm damage and decay development comprise nearly 30% of the ward's tree population. Twenty-four percent of maples exist in the ward and should be discouraged from large-scale planting. Those species near, at, or exceeding 10% of species diversity should be discouraged from planting and a focus to increasing species diversity is strongly recommended. Those species with high numbers of poor condition trees should be monitored closely for age and environmentally-caused decline. If not regularly treated, the remaining ash trees should be expected to be infested with the emerald ash borer.

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PARK TREE RESOURCE - City of Fairway, Kansas September 2017 Percent of Inventory Total

SPECIES	No. of Trees	Avg. Dia.	% Good	% Fair	% Poor	% Dead & Dying	% of Total Trees	Value
Mulberry	9	5"	33%	0%	67%	0%	14%	\$698
Pin oak	7	26"	72%	14%	14%	0%	11%	\$57,229
Red maple	6	17"	33%	67%	0%	0%	9%	\$7,565
European hornbeam	4	10"	100%	0%	0%	0%	6%	\$4,824
Juniper	4	3"	75%	25%	0%	0%	6%	\$434
Eastern white pine	4	5"	100%	0%	0%	0%	6%	\$1,521
Silver maple	3	7"	33%	67%	0%	0%	5%	\$574
Eastern redbud	3	5"	67%	0%	33%	0%	5%	\$498
Green ash	3	3"	67%	33%	0%	0%	5%	\$193
Hackberry	2	20"	0%	100%	0%	0%	3%	\$5,027
Austrian pine	2	22"	0%	100%	0%	0%	3%	\$7,037
Colorado blue spruce	2	6"	50%	50%	0%	0%	3%	\$815
Miscellaneous*	15	13"	%	%	%	0%	24%	\$37,752
TOTAL	64	12"	52%	31%	17%	0%	100%	\$124,167

***Miscellaneous:** (Tree species that represent 2% or less of the total inventoried park tree population):
Boxelder, Kentucky coffeetree, Ginkgo, goldenraintree, Japanese tree lilac; northern red and shingle oak;
ornamental pear, Scotch pine, common smoketree; Black Hills and Norway spruce; sweetgum, and black walnut.

Parks Overview:

It is realized that with a small number of park trees, anything planted in mass or allowed to establish, like the mulberries, will comprise a large percentage of the total. Plant an even wider variety of species to diversify the park when planting space becomes available. High percentages of red and silver maple, hackberry, Austrian pine, and Colorado blue spruce are in fair condition and should be managed to prevent a slide in condition. Great care should be taken to eliminate mechanical damage to all trees by mulching out to the dripline of the tree or eliminating grass and weeds within the dripline of trees. If not regularly treated, the remaining ash trees should be expected to be infested with the emerald ash borer.

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GREENSPACE TREE RESOURCE - City of Fairway, Kansas September 2017 Percent of Inventory Total

SPECIES	No. of Trees	Avg. Dia.	% Good	% Fair	% Poor	% Dead & Dying	% of Total Trees	Value
Crabapple	8	5"	25%	50%	25%	0%	9%	\$2,172
Black walnut	6	23"	17%	66%	17%	0%	7%	\$25,544
Sugar maple	5	9"	40%	60%	0%	0%	6%	\$5,574
Eastern redbud	5	6"	20%	60%	20%	0%	6%	\$1,834
Green ash	4	19"	0%	100%	0%	0%	5%	\$8,526
River birch	4	12"	75%	25%	0%	0%	5%	\$5,560
Pin oak	4	28"	25%	50%	25%	0%	5%	\$25,801
Eastern white pine	4	11"	50%	50%	0%	0%	5%	\$7,709
Flowering dogwood	3	6"	33%	67%	0%	0%	4%	\$999
Goldenrain tree	3	2"	67%	33%	0%	0%	4%	\$144
Norway spruce	3	5"	67%	33%	0%	0%	4%	\$1,014
Baldcypress	2	18"	100%	0%	0%	0%	2%	\$10,531
Black cherry	2	8"	0%	100%	0%	0%	2%	\$684
Hackberry	2	17"	0%	100%	0%	0%	2%	\$5,167
Honeylocust	2	22"	0%	0%	100%	0%	2%	\$3,857
Magnolia	2	6"	0%	100%	0%	0%	2%	\$506
Scotch pine	2	14"	0%	50%	0%	50%	2%	\$394
Eastern redcedar	2	16"	0%	50%	50%	0%	2%	\$4,295
Sweetgum	2	22"	50%	50%	0%	0%	2%	\$10,513
Miscellaneous*	20	13"	55%	30%	15%	0%	24%	\$26893
TOTAL	85	13"	37%	49%	13%	1%	100%	\$147,717

***Miscellaneous:** (Tree species that represent 1% or less of the total inventoried greenspace tree population): Boxelder, northern catalpa, Siberian elm, eastern hemlock, shagbark hickory; Japanese, red, silver, and trident maple; mulberry; bur, English, northern red, and shingle oak; ornamental pear, Colorado blue spruce, American sycamore, tuliptree, Viburnum, and willow.

Greenspace Overview:

Several species of trees were found in Fairway's greenspaces but plantings of crabapple should be limited. It should be noted that all honeylocust are poor, with 100% of green ash, black cherry, hackberry, and magnolia in fair condition. Pin oak, Siberian elm, and silver maple average diameters exceed 25 inches with boxelder, shagbark hickory, honeylocust, red maple, sweetgum, sycamore, and black walnut also found to have larger diameters over 20 inches. The city should be mindful of age and condition-related issues with these species in the years to come. If not regularly treated, the remaining ash trees should be expected to be infested with the emerald ash borer.

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SHAWNEE INDIAN MISSION TREE RESOURCE - City of Fairway, Kansas September 2017 Percent of Inventory Total

SPECIES	No. of Trees	Avg. Dia.	% Good	% Fair	% Poor	% Dead & Dying	% of Total Trees	Value
Hackberry	35	21"	20%	63%	17%	0%	19%	\$93,394
Mulberry	16	14"	0%	63%	31%	6%	9%	\$13,181
Pin oak	13	26"	0%	46%	54%	0%	7%	\$58,904
Austrian pine	12	23"	0%	58%	42%	0%	7%	\$35,622
Black walnut	12	26"	25%	67%	8%	0%	7%	\$72,947
Osage-orange	11	23"	0%	55%	36%	9%	6%	\$35,960
Green ash	9	16"	0%	56%	11%	33%	5%	\$7,487
Black cherry	6	18"	0%	50%	50%	0%	3%	\$7,812
Juniper	6	2"	50%	33%	17%	0%	3%	\$224
Sugar maple	6	15"	66%	17%	17%	0%	3%	\$16,339
Bur oak	6	21"	17%	33%	50%	0%	3%	\$24,651
Fruit species	5	8"	0%	0%	80%	20%	3%	\$1,408
Silver maple	5	32"	40%	40%	20%	0%	3%	\$16,984
Northern red oak	5	23"	0%	80%	20%	0%	3%	\$25,569
Swamp white oak	5	16"	60%	40%	0%	0%	3%	\$16,304
American elm	4	13"	0%	75%	25%	0%	2%	\$3,594
Eastern redbud	3	9"	0%	33%	0%	67%	2%	\$290
Miscellaneous*	21	17"	38%	19%	43%	0%	12%	\$57,348
TOTAL	180	19"	17%	49%	30%	4%	100%	\$488,018

***Miscellaneous:** (Tree species that represent 1% or less of the total inventoried tree population):

White ash, baldcypress, boxelder, northern catalpa, crabapple, Siberian elm; Norway and silver maple; shingle oak, staghorn sumac, sweetgum, American sycamore, tuliptree, black tupelo, and willow.

Shawnee Indian Mission Overview:

There's a special historical element tied to the forested cover at the Mission so when replanting is undertaken, careful species selection can acknowledge the heritage of the property while choosing more desirable types of trees less prone to storm damage and decay than the hackberry and mulberry that are in high abundance. Several species are larger than 20" in average diameter so age and environmentally-caused decline should be anticipated and those species with high percentages of fair condition trees should be monitored. If not regularly treated, the remaining ash trees should be expected to be infested with the emerald ash borer.

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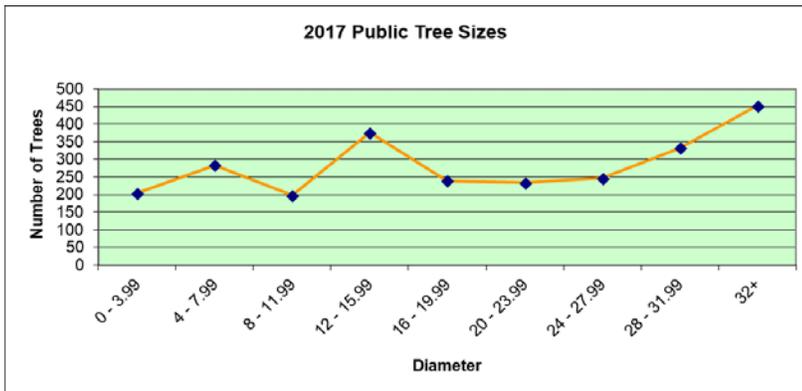
TREE SIZE AND CONDITION

The below graph shows the size class of all public trees inventoried. Sixty-two percent (62%) of the inventoried trees are in the diameter categories less than 20 inches. That is a good trend and I would encourage the city to further increase the number of young trees in public areas. A population of smaller trees is more likely to overcome severe weather events as opposed to large mature and overmature trees. A high population of large diameter trees can indicate an overmature population with potentially very high maintenance and removal needs.

The columns below highlight the age and condition of the older public tree resource:

Avg. Diameter	20"+	Avg. Diameter	32"+	Poor Condition	20"+	Poor Condition	32"+
Total Trees:	1,264	Total Trees:	452	Total Trees:	245	Total Trees:	68
Pin oak	619	Pin oak	304	Siberian elm	64	Pin oak	26
Sweetgum	113	Silver maple	34	Pin oak	51	Silver maple	14
Siberian elm	105	Siberian elm	27	Silver maple	39	Siberian elm	13
Silver maple	94	American elm	15	Sweetgum	17	American elm	4
Sugar maple	45	Hackberry	11	American elm	14	Mulberry	2
Hackberry	36	Sycamore	10	Hackberry	9	Osage-orange	2
American elm	35	Green ash	9	Black walnut	8	Northern catalpa	1
American sycamore	30	Sweetgum	7	Sugar maple	7	Hackberry	1
Green ash	29	North. red oak	6	Green ash	5	Chinkapin oak	1
Black walnut	27	Osage-orange	5	Shingle oak	4	Northern red oak	1
Northern red oak	22	Black walnut	5	Austrian pine	4	Shingle oak	1
White ash	13	White ash	4	White ash	3	Sweetgum	1
Red oak	12	Honeylocust	3	Mulberry	3	Sycamore	1
Austrian pine	12	Mulberry	2	Northern red oak	3		
Shingle oak	10	Shingle oak	2	Boxelder	2		
Osage-orange	10	Tuliptree	2	Honeylocust	2		
Honeylocust	6	North. catalpa	1	Osage-orange	2		
Mulberry	6	A. linden	1	Miscellaneous*	8		
Tuliptree	5	Sugar maple	1	<i>1 tree each: northern catalpa, black cherry, red maple, bur oak, chinkapin oak, ornamental pear, eastern redcedar, sycamore</i>			
Miscellaneous*	35	Bur oak	1				
		Chinkapin oak	1				
		East. white pine	1				

The city should familiarize themselves with where these trees are to be able to monitor them as they age and decline. See the enclosed inventory reports for specific species information regarding all sizes and conditions.



 Cottonwood, hackberry, Siberian elm, Tree-of-Heaven, boxelder, silver maple, Bradford pear, poplar and willow are species with very high hazard indices. Refer to the enclosed draft publication *Guidelines for Assessing Failure Potential Associated with Tree Defects* for specific specie information.

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PLANTING TRENDS

The City of Fairway tree planting trends were developed by examining all trees less than four inches in diameter. Two hundred four (204) young trees were found in public areas in Fairway. These newly-planted trees represent 8% of the total tree population and have an estimated value of \$7,894. Most of these young trees are in good to fair condition. There is a fair diversity of species being planted in Fairway public areas overall.

PLANTING TRENDS			
Species	# of Trees under 4"	% of Total Trees Under 4"	Value
Eastern redbud	29	14%	\$1,280
Serviceberry	23	11%	\$1,056
Crabapple	11	5%	\$486
Flowering dogwood	10	5%	\$308
Juniper	10	5%	\$416
Red maple	10	5%	\$156
Sugar maple	9	4%	\$468
Mulberry	8	4%	\$144
Trident maple	7	3%	\$320
Green ash	6	3%	\$120
Hackberry	6	3%	\$120
Northern red oak	6	3%	\$306
Littleleaf linden	5	3%	\$240
Miscellaneous*	64	31%	\$2,474
YOUNG TREE TOTAL**	204	8% Of All Trees	\$7,894

***Miscellaneous:** (Tree species with less than 5 trees under 4 inches in diameter):

Arborvitae, baldcypress, Tricolor beech, common chokecherry, Kentucky coffeetree, Siberian elm, fruit species, ginkgo, goldenraintree, European hornbeam, magnolia; amur, Freeman, Japanese and Norway maple; mimosa; bur, pin, swamp white and willow oak; ornamental pear; Austrian, eastern white, and Scotch pine; purpleleaf plum, eastern redcedar, common smoketree, Norway spruce, staghorn sumac, tuliptree, black tupelo, and Japanese zelkova.

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COMPARISON WITH 2007 INVENTORY

A 100% public tree inventory was conducted in Fairway October of 2007, before the Shawnee Indian Mission and its trees were within management control of the city. That inventory found 3,079 trees growing on public properties, compared to the 2017 population of 2,564 trees.

Notable occurrences in the 10 years between inventories is that in 2012 the city enacted an ash management plan in response to the emerald ash borer being found in metro Kansas City so there were approximately 193 fewer ash trees in the city in 2017. Additionally, trees in traffic islands and medians that were included in the 2007 inventory were not included in the 2017 inventory. Storms have had a significant impact on the population of city trees, as well.

The community forest in Fairway has matured, with the average diameter in 2017 19" versus an average diameter of 17" in 2007. Another change is the percentages of good and fair condition trees. In 2007, 49% of the population was in good condition and 33% in fair; now in 2017, 33% of trees were considered in good condition and 46% in fair. Drought, environmental stressors, and storms are the likely culprit in the noted condition change as well as age-related decline. Of note is the decreased number of good condition pin oaks, sugar maple, and sweetgum.

It is possible to make some comparisons between the 2007 and 2017 inventories. The chart below provides some inventory highlights:

2007 to 2017 Comparison of Public Trees						
Dominant Species	Number of Trees		Avg. Diameter		% of Total Trees	
	2007	2017	2007	2017	2007	2017
Pin oak	666	662	27"	29"	22%	26%
Sugar maple	363	300	14"	14"	12%	12%
Sweetgum	273	242	19"	20"	9%	9%
Green ash	256	53	17"	20"	8%	2%
Siberian elm	187	126	25"	26"	6%	5%
Red maple	147	164	9"	12"	5%	6%
Silver maple	140	124	21"	24"	5%	5%

In comparison of the 2007 and 2017 public tree data, other trends include:

- Decrease in population of "less desirable" species, such as Siberian elm, silver maple, hackberry, and green ash. Populations of red maple, however, have increased. Efforts should continue to decrease the numbers of silver maple, hackberry, green ash, and Siberian elm and not substantially increase the number of pin oak, sweetgum, red maple, sugar maple, and eastern redbud.
- Long-lived, stronger-wooded species on the increase include Ginkgo and oaks, but with oaks comprising 30.5% of the total population, care should be taken to not significantly increase this genus of trees.
- Species diversity, a strong measure of the overall health of the community forest resource, has increased by five species between 2007 and 2017. Strong encouragement is given to continue to introduce more species of trees within the community. Care should be taken to not significantly increase the population of maples.

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General Recommendations Planting and Selection

Planting is the most important aspect of most programs. This facet generally has the most appeal for, and most support by, the public and governing administration. Consideration should be given not only to the planting of trees, but also for the “establishment” of trees. In other words, all losses should be replanted until a 100 percent survival is achieved. I would also recommend that the City of Fairway consider the following specific recommendations regarding planting.

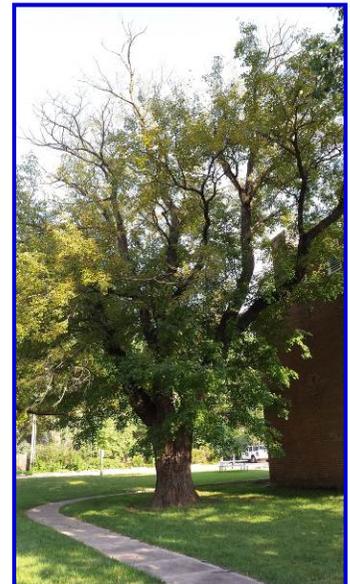
The city should budget money for the planting and establishment of a certain number of desirable and recommended species of trees each year. Fairway could lose 21% *or more* of its canopy in the next 10 to 15 years. Approximately 27 trees (1%) are dead or dying and any remaining should be removed promptly. Twenty percent (20%) of the total tree population is in poor condition, with many trees in that category at higher potential for accelerated decline in health due to cavity development and other structural decline. Some of the fair condition trees, especially those more prone to storm damage, poor compartmentalizers and susceptible to other sources of decline, may need to be replaced, especially those populations comprised of hackberry, silver maple, Siberian elm, ash, birch, black walnut, honeylocust, ornamental pear, and redbud. Mature pin oak may become more vulnerable to age and climate-related decline. Emerald ash borer is a current threat to untreated ash, and pine wilt, oak wilt, and Dutch elm disease are present in many communities, placing the American elm, pines, and red oak group of oaks at risk.

Some species of trees need to be monitored due to their propensity to develop structural defects and to be damaged by environmental stresses, commonly leading to failure. The following species of trees found in the inventory are generally rated with high and very high species hazard indices: *ash, hickory, Kentucky coffeetree, black locust, honeylocust, ornamental/ Bradford pear, eastern white pine; Colorado blue, Black Hills, and Norway spruce; black walnut, birch, boxelder, Siberian elm, hackberry, silver maple, and willow.* Trees rated as fair within these species could worsen in condition if damaged by severe weather events or experience increased defect formation. This data can be found in the table on page 5 of this report and within the enclosed data sheets to identify the percentages of fair condition trees with high and very high hazard indices.

A tree’s diameter can be used as an indicator of age. Species with large average diameters should be monitored closely. Their condition will help determine the necessary level of management. Larger trees should also be monitored for decline from natural causes or stress-induced causes. See the table on page 14 for a detailed list of species with larger diameters.

Some poor condition trees may be managed back to improved condition with some fair condition, large diameter trees continuing to mature and possibly decline in health. *An objective should be to decrease the number of dead and dying, poor, and fair condition trees while increasing the number of good condition trees on Fairway public properties.*

The draft publication *Guidelines for Assessing Failure Potential Associated with Tree Defects* is included as a reference to provide detailed information concerning severe and critical defects, failure profiles of common Kansas trees, and Kansas species hazard indices.



Large diameter trees are susceptible to age-related and environmental stresses.

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Based on the current findings of this inventory, coupled with known insect and disease problems of certain species, I would discourage any future planting/promotion of the following species:

Species	Reason	Alternative
Pin oak Sugar maple Sweetgum Red maple	Overstocked or near overstocking potential	Ginkgo (male) American linden Baldcypress Dawn redwood (conservatively) Kentucky coffeetree
Green and white ash	Borers – emerald ash borer and native borers; ash yellows disease	American yellowwood Western soapberry Lacebark elm Japanese pagodatree
Green ash Siberian elm Hackberry Silver maple Boxelder	Hazard tree potential	Shantung maple and hybrids Osage-orange (male) London planetree Black tupelo Turkish filbert (conservatively)
Scotch and Austrian pine	Pine Wilt disease Needle diseases	Limber or pinyon pine Black Hills spruce Upright Chinese juniper Serbian spruce (conservatively) Douglasfir (conservatively) Eastern hemlock (conservatively)
Red Oak species	Oak Wilt disease	Wide variety of white oak species Baldcypress American beech (conservatively)
Honeylocust	Thyronectria canker Honeylocust complex	Hophornbeam Littleleaf linden American elm (DED resistant)

The publication *Tree and Shrub Problems in Kansas: Diseases, Insects, and Environmental Stresses* details many problems of woody plants in Kansas.

It can be found online at <http://www.ksre.ksu.edu/bookstore/pubs/MF3132.pdf>.



At Left: Pine wilt has killed thousands of Scotch and Austrian pines in Kansas since 1979. At right: A small ash tree is riddled with the damage of emerald ash borer larvae.



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Coupled with the knowledge of what “not” to plant is the identified need of what can be successfully established in Fairway. I would offer the following recommendations to meet the general planting needs of the city. *I would, however, emphasize that these are general recommendations and planting projects should not be limited by this list.*

Small Trees (under 30 feet at maturity)

- Crabapple (resistant to apple scab, rust, and fireblight)
- Amur maple
- Oklahoma redbud
- Japanese tree lilac
- Autumn Brilliance serviceberry
- Winterberry Euonymous
- Common chokecherry
- Tree-form Viburnums



Blackhaw Viburnum

Medium Trees (30 - 70 feet at maturity)

- Lacebark elm
- Kentucky coffeetree
- Ginkgo (male)
- Shantung maple
- American yellowwood
- Japanese pagodatree
- Osage-orange (thornless/fruitless)
- Western soapberry
- Chinkapin oak
- Nuttall oak
- Overcup oak
- Swamp white oak
- English oak
- American and littleleaf linden
- Persimmon



Ginkgo in fall color

Large Trees (more than 70 feet at maturity)

- White oak
- Bur oak
- Cherrybark oak
- Sawtooth oak
- Shingle oak
- Baldcypress



Sawtooth oak in dormancy

Evergreen Trees

- Upright Chinese junipers
- Eastern redcedar and cultivars
- Limber pine
- Eastern white pine
- White/concolor fir
- White/Black Hills spruce
- Eastern hemlock



Concolor fir



White spruce

Please refer to the enclosed *Preferred Tree List for Northeast Kansas*, *Trees Worth Trying*, and *Shade and Ornamental Trees for Kansas* for further details and expanded species recommendations.

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The proper selection and planting of trees is critical for successful establishment. One of the biggest hurdles that a city can face with tree planting is planting in unprotected areas with poor soils and inadequate moisture. In addition to difficult site conditions, trees continue to be planted incorrectly and continue to be planted with stem girdling or stem encircling roots. When these poorly-developed root systems are placed in the landscape, it is likely that the tree will not grow to a mature size. The function of tree roots can be harmed when planted too deeply. Some basic recommendations to remember when selecting and planting trees are:



A successfully established tree on a very poor, heavy clay site.

- Start with selecting high quality nursery stock. See page 1 of this publication: <http://www.ksre.ksu.edu/bookstore/pubs/L870.pdf>.
- Determine if the root flare is at the top of the root ball or at the top of the soil in the container before purchasing the tree. Visit <http://www.ksre.ksu.edu/bookstore/pubs/MF1119.pdf> and the above publication.
- Remove any soil that covers the root flare (where the trunk and first roots meet), dig the hole depth according to the remaining root mass, and place the root flare at or slightly above the soil original level.
- Stake trees when environmental conditions could cause the roots to shift and move during the establishment period. See <http://www.ksre.ksu.edu/bookstore/pubs/MF1120.pdf> for proper staking methods.
- Mulch the tree. Do not pile mulch against the tree stem and do not place more than 3 to 4 inches of mulch over tree roots. Excessive mulch can be as damaging as planting too deeply. Visit the following publication for proper mulching techniques <http://www.treesaregood.org/portals/0/docs/treecare/ProperMulching.pdf>
- Ensure that establishing trees have adequate soil moisture the first three years after planting and any other time when rainfall amounts do not moisten the soil to a depth of twelve inches (12"). Learn how to water newly-planted and established trees by viewing <http://www.ksre.ksu.edu/bookstore/pubs/MF2800.pdf> and <http://www.ksre.ksu.edu/bookstore/pubs/MF2801.pdf>.

Additional Resources to Avoid Tree Planting Problems:

- The University of Minnesota Extension. *A practitioner's guide to stem girdling roots of trees*. Found online at <https://www.extension.umn.edu/garden/yard-garden/trees-shrubs/img/guide-stem-girdling-roots.pdf>
- Sydnor, T. Davis. *Girdling Roots: A Problem of Shade Trees*. Found online at <http://archive.lib.msu.edu/tic/holen/article/2003oct9.pdf>



Excess soil was over the root system of this tree when it was harvested, requiring it to be removed at planting.

Industry Standards and Best Management Practices:

- AmericanHort. *American Standard for Nursery Stock*. ANSI Z60.1-2014. Found online at http://americanhort.org/documents/ANSI_Nursery_Stock_Standards_AmericanHort_2014.pdf
- International Society of Arboriculture. ANSI A300 Standards and Best Management Practices. Found online at <http://www.isa-arbor.com/store/category.aspx?cid=117>



Not only was this tree planted too deeply, but a future stem-girdling root would have shortened the life of this tree.

Other tree selection, care, and maintenance topics may be found at <http://www.kansasforests.org/resources> > Community Forestry

Maintenance

Maintenance is the portion of a tree program that is most often overlooked by most communities. Nothing can be more detrimental to citizen and board support than to waste money on tree plantings which die from neglect due to lack of water, mower injury, poor pruning, or insect and disease. A maintenance program/schedule should be developed for every planting and periodic surveys should be made to determine which trees to remove and prune. Pesticide treatments are costly and should be used only on select trees of excellent condition and form. Proper species selection and a good sanitation program (dead tree removal) are much more effective at preventing insect and disease outbreaks than pesticide application. In fact, most pesticide applications do not prevent insect and disease problems; rather they focus on control after the problem exists. Appropriate tree selection, planting, and maintenance allows trees to grow at their optimum growth rate which is the best way to prevent insect and disease problems. Proper pruning, especially when trees are young, can eliminate unnecessary work and labor costs later on and help minimize storm damage. Maintaining mulch zones around the base of younger trees, eliminating grass and weeds in these mulched areas, and the timely delivery of water are critical to the healthy establishment of trees.

Please refer to the enclosed appendices for further information on tree maintenance recommendations.

I would suggest that citizens, tree board members and city employees learn to identify and implement controls for some of the common problems associated with the following species:

- | | |
|----------------------------------|---|
| Austrian and Scotch Pine: | Tip blight (<i>Diplodia</i>), needle blight (<i>Dothistroma</i>), pine wilt |
| Eastern redcedar: | Kabatina blight, Cercospora blight, bagworms, spider mites |
| Ash species: | Emerald ash borer, anthracnose, ash borers, ash yellows |
| Maple species: | Anthrachnose, verticillium wilt, root rot, flatheaded borer |
| Oak Species: | Oak wilt |
| American Elm: | Dutch elm disease |

This list represents current, future, threatening, common, and potentially controllable insect and disease problems associated with several tree species within Fairway. It is not intended to be a comprehensive list. Please refer to the enclosed insect and disease publications for further details. Further recommendations on species selections, removals and planting innovations are included in the recommendation section of this report. For more topics relating to common plant and tree problems, visit <http://www.hfrr.k-state.edu/extension/info-center/plant-pest-problems.html>



Proper pruning is critical for a strong maintenance program



Poor staking practices and mower damage can lead to tree decline and death



Pine wilt continues to negatively impact most Kansas communities

High Risk and Hazardous Tree Management

In order to remove hazards to life and property, reduce the spread of disease, provide for beautification, and reduce maintenance costs, it is always good practice to remove dead and dying trees promptly from Fairway public properties, as they were after this inventory. The inventory found 27 trees to be dead or dying and in need of removal. Depending on specific situations, management needs and capabilities, the 510 trees in the poor condition class may also need to be removed in the nearer future. Siberian elm, silver maple, hackberry, American elm, ornamental pear, and black walnut have more than 20% of trees in the poor condition category, totaling about 186 trees from the population of those species alone. Silver maple, hackberry, green ash, and Siberian elm are highly prone to storm damage and structural decline, especially as they age. Other large diameter species are susceptible, as well, to damage and decline as those species mature, so the potential for removals certainly could increase due to several trees reaching a mature or over-mature state.



Dead wood can fail unexpectedly and should be removed promptly.

TREE RISK MANAGEMENT

A community tree inventory plays an important role in tree risk management. An inventory provides detailed information about the diversity, health and age of the community forest. This information, in turn, gives forest managers and city leadership necessary information to make informed decisions in developing tree risk management strategies.

The two guiding principles of tree risk management programs are:

1. Increase public safety
2. Promote tree health and sustainability

As detailed in *Community Tree Risk Management: Program Planning and Design*, a community forestry program would integrate tree risk management, tree planting, emergency response and tree pruning and maintenance programs. When a community adopts a proactive approach to public tree management, the result will be a healthier and safer tree resource. This extensive publication may be found online at: <https://tinyurl.com/y8p9dlof>. It is **strongly recommended** that city staff and tree board members review and integrate pertinent components from this resource into your community tree program.



A vertical crack and evidence of decay create a very high risk of failure.



Mature tree care often requires the work of professional arborists



The presence of fruiting bodies is an indicator of advanced decay.

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CONCLUSION

Trees are an asset to any community. They modify the urban environment, beautify a community, add property value, and are usually responsible for the first and last impression of a town. The tree board, city departments, and officials have made a very positive and lasting improvement upon the resource for all to benefit from and enjoy. Based upon the recent inventory results and recommendations I would offer the following highlights and priorities:

- At the time of the inventory, 2564 public trees were located within the city limits of Fairway, of which 33% were in good condition, 46% in fair condition and 20% poor condition. Approximately 27 trees (1%) were considered dead or dying and have been removed.
- The 20% of poor trees, 510 trees in total, need intensive management assistance or may need to be removed in the near future.
- The 46% of fair trees, 1190 trees in total, have minor maintenance requirements such as pruning or insect and disease control needs.
- Pin oak comprises the largest percentage of species, followed by sugar maple, sweetgum and red maple, which combine for a total of 53% of the total population.
- There are several species with average diameters at or over 24 inches – totaling 1,015 trees. These species comprise 40% of the total tree population.
- Approximately 76 species are represented in the inventoried areas of Fairway.
- To charter a future course for the city it is recommended that a mission statement, with desired goals and objectives, be identified for the community. This planning should include targets, time frames, and budgetary commitment that supports achievement. Objectives could be:
 - *Increase the number of species established to 85.*
 - *Increase the number of good condition trees to 40%.*
 - *In the next 15 years, plant and establish a minimum of 600 trees in anticipation of the loss of approximately 540 trees that are dead and dying, more than 20" in average diameter, poor condition, threatened by the emerald ash borer, drought and storms.*
- Establish an annual budget and plan of work which targets the needs of planning, planting, maintenance, and tree removals.
- Due to overstocking, high failure potential, and insect and disease problems it is recommended that the following species not be planted or encouraged in the future: pin oak, sugar maple, sweetgum, hackberry, silver maple, ash, Siberian elm, Scotch and Austrian pine, honeylocust, Bradford pear, cottonwood, and poplar.
- Planting and establishment of quality trees, rather than quantity, is recommended to ensure a healthy and safe community forest in the years to come.



33% of Fairway's public trees are in good condition



40% of all trees have average diameters 24" or larger



Tree planting is an investment for our environment and future.

CITY OF FAIRWAY, KANSAS

September 2017

APPENDIX A

Ecosystem Services of Fairway's Public Trees

In addition to the many benefits listed on page 4 of this report, trees provide specific environmental services to the community that can now be quantified through use of i-Tree STREETS, a software program that provides community forestry analysis and benefits assessment tools. STREETS quantifies ecosystem services such as energy savings, air quality improvement, carbon dioxide reduction, stormwater runoff reduction, aesthetic and economic improvements. The information from the enclosed STREETS reports may be used for environmental planning and strategies, regional and county planning, sustainability efforts, and to meet stormwater mandates placed by state and federal agencies.

To be able to calculate these benefits, Fairway's inventory data was imported into the program. It should be pointed out that the two software programs used to prepare this management recommendation are very different and will yield different valuations of the trees. The enclosed STREETS reports reveal *only the total ecosystem benefits of the trees*.

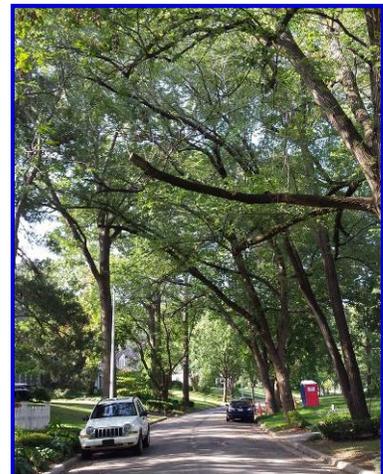
Highlights of the enclosed STREETS reports revealed the following **total annual benefits**:

Ecosystem Service	Resource Unit Quantity	Value of Ecosystem Service
Energy conservation	636.9 MWh, 84,929.1 Therms	\$131,568
Carbon dioxide sequestration	2,240,496 net pounds	\$16,804
CO ² emissions avoided	1,068,236 pounds	\$8,012
Air pollutant absorption	7,554 pounds	\$20,558
Air pollutant emissions avoided	6,765 pounds	\$18,854
Stormwater reduced flow	7,036,942 gallons	\$190,701
Aesthetic and other benefits		\$238,573
Total Annual Benefits		\$598,204

While not an annual benefit, the public tree resource also stores a considerable amount of carbon dioxide – 32,001,870 pounds - with a calculated benefit of **\$240,014**. *This ecosystem service will be lost if removed trees are chipped and/or burned*. The city should consider building partnerships that would utilize downed public trees that, even when milled as lumber or made into furniture, continue to store carbon dioxide.

Please refer to the enclosed STREETS reports for specific information and values. The *Midwest Community Tree Guide*, the basis for the data and values utilized in STREETS, provides yet more detailed and pertinent information. It may be found online at

http://www.fs.fed.us/psw/publications/documents/psw_gtr199/psw_gtr199.pdf



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NOTES: