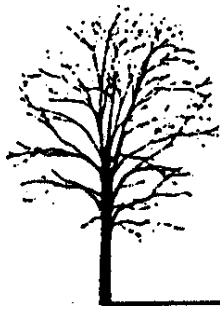


Summary and Analysis of the Marietta City Urban Forest 2000



Marietta Tree Commission

Members of the Marietta City Tree Commission Fall, 2000

Graham Metzger
Mark Neyman
Marilyn Ort
Julia Paugstat
Steven R. Spilatro, Chair
Jim Stephens
Lynn Thiel
Randa Walter
Pat Wood

Methodology

The Marietta Tree Commission received a \$5000 grant for the Ohio Department of Natural Resources in 1994 to purchase tree inventory software, *Tree Manager*, marketed by ACRT. The inventory data was tallied onto data sheets by site inspection by Tree Commission members and several other volunteers, and the data was then entered into the database. In 1998, existing data was transferred to a new, custom tree inventory program, *sTREEbase*, written by Steven R. Spilatro, which has been used since that time. All data presented in this document were produced using the *sTREEbase* program; graphs were produced using Microsoft Excel. The data presented in this summary includes trees planted through April 2000.

Scope of inventory

The city tree inventory is intended to include all trees in public areas, parks and City right-of-ways. Street trees are those along city streets in the City right-of-way, which, in general, is the grassy lawnstrip area between the street curb and the sidewalk. Although for some streets the City right-of-way extends into yards beyond the sidewalk, in general, yard trees are not included except along some streets where there is no sidewalk.

Areas that are not included in the inventory at the time this document was written include Lookout park (except for fruit trees planted in 1998 as part of a community orchard), Buckeye Park, Civitan Park (at 7th and Ephraim-Cutler Streets) the City entranceway along Fort Harmar Drive (except for the cloverleaves at the intersection of Fort Harmar Drive and Gilman), the Muskingum Riverbank south of the Putnam Bridge, and most of the residential North Hills residential area (which doesn't have lawnstrips). In general, trees along the top of riverbanks were inventoried but not those along the sides or at the water edge, except along the bank of the Ohio River from Porter Street to South Fourth Street where all trees are inventoried.. Trees in natural areas also were not inventoried.

Tree condition is currently not maintained in the city inventory because of difficulty in assuring consistent assessment of tree condition by volunteers and keeping condition data current.

Limitations and potential errors

Identification of most tree species has been confirmed by secondary inspections following the initial data acquisition. Errors are anticipated to exist for certain genera. Mature green and white ashes have not been identified to the species level, and data for ashes has usually been combined. Likewise, linden species were not always identified. For some genera, (e.g. elms, Table 1A), species is reported for some but not all trees. It is likely that another error may be miss identification of some maple species (e.g., norway maples as sugar maples), oaks, and dogwoods (Korean vs flowering). In genera, variety of ornamental flowering trees such as crabapples, hawthorns, cherry and plum, was not determined.

Some of the summary data may have minor inaccuracies where species data includes variety. For example, red maple variety occasionally was included in inventory data, and these trees sometimes appear separately (see Table 1A).

Total percentages may vary from 100% due to rounding errors.

Summary of data

As of April, 2000, the city tree inventory includes 3813 street trees and 678 park trees.

Species Diversity

For wider recognition, trees are identified by common name in this summary; however, a list of scientific names is provided in [Appendix A](#). The Marietta City urban forest encompasses a relatively broad diversity of tree species ([Tables 1](#) and [Table 1A](#)), and stands up relatively well to the urban forestry “10-20-30” standard; i.e., that a single species should comprise no more than 10% of the total number of trees, a genus should comprise no more than 20%, and a family no more than 30%. Only the maples currently approach or exceed these levels. Sugar maple (9%) and red maple (7%) are the most common city species ([Table 1](#) and [Figure 1](#)). Other species that represent at least 5% of the tree population include crabapples (6.2%), sweetgum (5.7%), silver maple (5.6%) and flowering dogwood (5.1%).

Acer (27%) is the only genus to exceed the 20% rule, and along with *Quercus* are the only genera to represent greater than 10% of the urban forest ([Table 2](#) and [Figure 2](#)). Tree diversity was not summarized at the family level. When considering only park trees only ([Table 3](#) and [Figure 3](#)), crabapples (17.6%) and silver maples (11.6%) and sycamores (7.7%) are the most common species. The abundance of silver maples and sycamores reflects the location of parks space along the Muskingum and Ohio riverbanks, a preferential site for planting of these species.

Forest maturity

An active planting program over the last 25 years and particularly in the 1990s has created a tree size distribution skewed toward smaller trees (Diameter at Breast Height (DBH) ≤ 3 ”; [Table 4](#) and [Figure 4](#)). This pattern probably also reflects planting of a larger proportion of flowering trees (under utility lines) in the city urban forest.

Size distributions for the predominant shade tree species are presented in [Table 5](#) and [Figures 5](#), [5A](#) and [5B](#) and suggest some future trends in tree diversity. Based upon tree DBH size distributions, we can expect sweetgum, norway maple, sugar maple, pin oak and linden to be less common in the City urban forest in the coming decades. In contrast, red maple, honey locust, willow oak, red oak, ginkgo and blackgum should become more common.

Planting trends

The city investment in tree planting the 1990s ([Table 6](#) and [Figure 6](#)) was enhanced by grant writing by the Tree Commission ([Appendix B](#)). A number of issues have influenced recent species planting selections and have influenced the DBH size distributions observed for shade trees. Sweetgums were planted in great numbers in the 1960s and 1970s, but concerns over limb strength, extensive surface and girdling roots, and fruitball hazard on sidewalks lead to this tree being placed on the prohibited species list. High maintenance costs and hazards posed by drooping lower limbs of pin oak and inherent structural weakness of silver maple lead to prohibition of these species as street trees (although many silver maple have been planted along riverbank parks). Concern about species decline and abundance discouraged extensive planting of norway and sugar maples. Although not yet reflected in the data, far fewer ashes have been planted since 1995 since an infestation of ash and lilac borers.

Other species have been planted in greater abundance in the last decade, including honeylocust, red maple, willow oak and ginkgo out of respect to their hardiness and low

maintenance costs. While not reflected among predominant species, planting of native trees reintroduced species generally less common in urban forests, including blackgum, sassafras, silverbell, native oaks, and buckeye.

Species Hardiness

Inventory planting records are just now becoming sufficient to evaluate survival of species planted within Marietta (Tables 7 and 7A). However, interpretation of the species survival should be considered in context of the stressful conditions that generally prevail in street right-of-ways and the variety of microhabitats that exist. Among the more commonly planted species (Figure 7), blackgum, hawthorn and sourwood appear to have lower survival. However, other observations (not presented here) indicate that once established, blackgum and hawthorn are very hardy. Considering tree removals overall, sugar maple has been the most widely removed tree, and reflects a general decline in this species within the city and elsewhere.

Other Data

Table 9 and Figure 9: Average tree planting costs.

Table 10: Summary of Tree maintenance costs.

Table 11: Trees planted according to mature size.

Table 12: location of remaining American Elms.

Appendices

A. Common and scientific names

B. Grants and major donations

Table 1. Frequency of Predominant Species. This table lists species representing 1% or more of city trees (streets and parks).

Genus	Number of Trees	% of City Total	Avg DBH (in.)
Maple, Sugar	417	9	18.1
Maple, Red	324	7	9.7
Crabapple*	286	6.2	4.7
Sweetgum	263	5.7	15.8
Maple, Silver	257	5.6	20.2
Dogwood, Flowering	235	5.1	6.1
Oak, Pin	204	4.4	18.0
Ash (White and Gree)	190	4.1	13.8
American Sycamore	165	3.6	25.6
Oak, Northern Red	150	3.3	7.0
Oak, Willow	149	3.2	6.4
Hawthorn	135	2.9	3.7
Honeylocust	108	2.3	5.9
Maple, Norway	103	2.2	14.2
Pear, Ornamental	103	2.2	4.4
Tulip Tree	75	1.6	19.7
Japanese Tree Lilac	59	1.3	3.1
Maple, Norway-cr Kng	61	1.3	7.4
Ginkgo	62	1.3	4.8
Goldenrain Tree	54	1.2	3.4
Serviceberry	57	1.2	2.7
Linden	53	1.1	14.2
Others (< 1%)	986	20.5	6.8
Total	4496		

*all; mixed species and varieties

Figure 1. Frequency of Predominant Species. Data from Table 1.

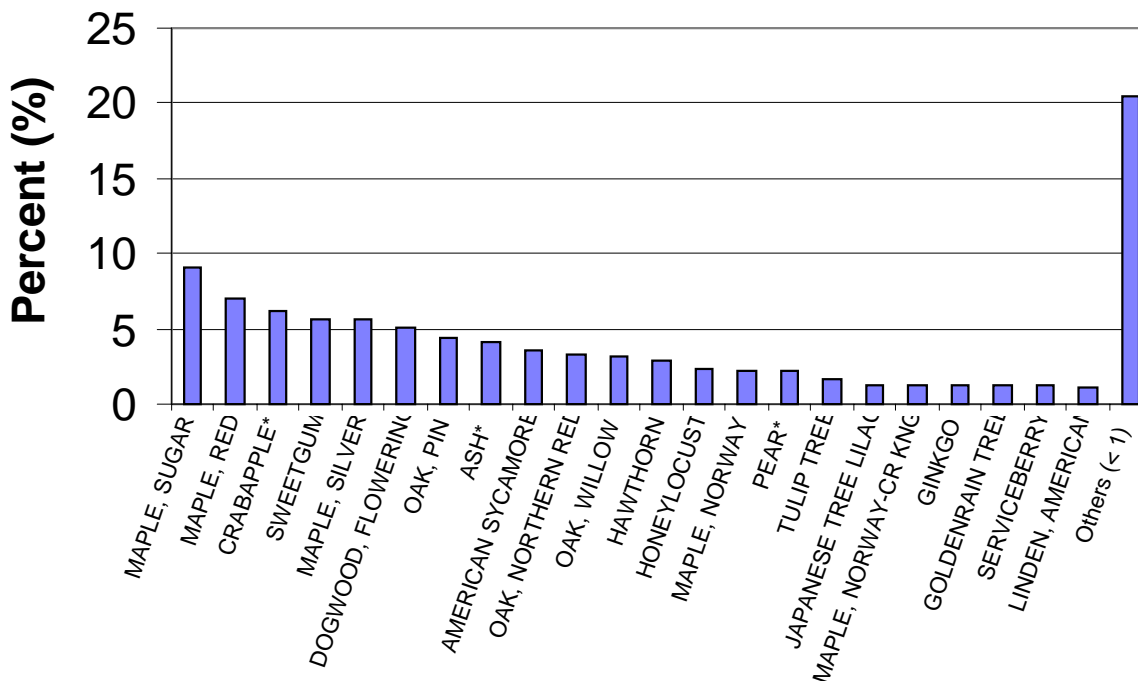


Table 1A. Frequency of Secondary Species. Species representing less than 1% of city trees (street and park).

Genus	Number of Trees	% of City Trees	Avg DBH (in.)
Alder, European	4	0.1	2
Apple	5	0.1	5
Arborvitae, American	2	>0.1	1
Ash, Green-mars Seed	4	0.1	3
Ash, White	15	0.3	19.47
Ash, White-aut Appl	9	0.2	2.67
Ash, White-aut Purple	3	0.1	2
Baldcypress	36	0.7	3.82
Beech	6	0.1	2.33
Beech, American	1	>0.1	1
Beech, Cutleaf	1	>0.1	4
Beech, European	1	>0.1	5
Birch	8	0.2	4.63
Birch, Paper	2	>0.1	6
Birch, River	13	0.3	2.38
Black Locust	2	>0.1	14
Blackgum	32	0.7	4.09
Blackhaw Viburnum	4	0.1	2.5
Boxelder	13	0.3	16.69
Buckeye, Ohio	3	0.1	8
Buckeye, Yellow	18	0.4	8
Cedar, Atlas	3	0.1	6.33
Cherry, Black	3	0.1	14.33
Cherry, Kwanzan	4	0.1	2
Cherry, Other	35	0.8	5.97
Cottonwood, Eastern	10	0.2	25.6
Cucumber Tree	1	>0.1	12
Dawn Redwood	17	0.4	5.65
Devils Walking Stick	2	>0.1	1
Dogwood, Kousa	25	0.5	3.24
Eastern Hophornbeam	3	0.1	2.33
Eastern Redbud	9	0.2	6.22
Eastern Redcedar	2	>0.1	8.5
Elm	5	0.1	21
Elm, American	15	0.3	33.88
Elm, Chinese	6	0.1	3
Elm, Siberian	1	>0.1	46
Elm, Slippery	2	>0.1	16
Franklin Tree	3	0.1	2
Fringe Tree	14	0.3	1.57
Hackberry	12	0.3	17.33
Hackberry, All Seasons	13	0.3	4.31
Hardy Rubber Tree	32	0.7	4.91
Hemlock, Eastern	6	0.1	15.5
Hickory, Shagbark	2	>0.1	12.5
Holly Species	25	0.5	8.52
Holly, American	2	>0.1	8.5
Hornbeam, European	34	0.7	4.3
Horsechestnut	3	0.1	10.67

Table 1A, cont. Frequency of Secondary Species. Species representing less than 1% of city trees (street and park).

Genus	Number of Trees	% of City Trees	Avg DBH (in.)
Japanese Tree Lilac	9	0.2	4.33
Japanese Pagoda Tree	4	0.1	7.25
Katsura Tree	15	0.3	5.33
Kentucky Coffeetree	29	0.6	3.79
Larch, European	1	>0.1	3
Linden	1	>0.1	13
Linden, Greenspire	1	>0.1	3
Linden, Little Leaf	1	>0.1	9
London Planetree	5	0.1	13.6
Magnolia	20	0.4	3
Magnolia, Saucer	3	0.1	8
Magnolia, Southern	2	>0.1	5
Magnolia, Star	5	0.1	2
Magnolia, Sweetbay	9	0.2	2.22
Maple	2	>0.1	4
Maple, Amur	8	0.2	6.75
Maple, Armstrong	1	>0.1	4
Maple, Black	1	>0.1	12
Maple, Celebration	4	0.1	4.75
Maple, Hedge	3	0.1	7.33
Maple, Japanese	21	0.5	5.67
Maple, Norway-col.	1	>0.1	6
Maple, Norway-schw	1	>0.1	17
Maple, Paperbark	14	0.3	2.29
Maple, Red-oct Glory	1	>0.1	2
Maple, Red-red Sunst	10	0.2	2.8
Maple, Sugar-columnr	1	>0.1	20
Maple, Sycamore	1	>0.1	8
Mimosa	12	0.3	4.33
Mulberry, Red	1	>0.1	10
Mulberry, White	2	>0.1	15
Oak	1	>0.1	3
Oak, Black	4	0.1	4.25
Oak, Bur	4	0.1	3
Oak, Chestnut	2	>0.1	4
Oak, English	2	>0.1	2
Oak, Sawtooth	14	0.3	4.64
Oak, Scarlet	10	0.2	3
Oak, Shingle	7	0.2	2
Oak, Shumard	13	0.3	2.92
Oak, Southern Red	1	>0.1	2
Oak, Swamp Chestnut	1	>0.1	1
Oak, Swamp White	26	0.6	2.04
Oak, White	6	0.1	4
Parrotia	8	0.2	2.38
Paulownia	1	>0.1	48
Peach	2	>0.1	2
Persimmon, Common	5	0.1	1.4

Table 1A, cont. Frequency of Secondary Species. Species representing less than 1% of city trees (street and park).

Genus	Number of Trees	% of City Trees	Avg DBH (in.)
Pine	17	0.3	8.8
Plum, American	2	>0.1	2
Plum, Ornamental	27	0.6	6.9
Poplar, Balsam	1	>0.1	10
Rose-of-sharon	1	>0.1	2
Sassafras	13	0.3	2.69
Silverbell	4	0.1	2
Smoke Tree	2	>0.1	3
Snowbell	3	0.1	2.67
Sourwood	31	0.7	2.42
Spruce	10	0.2	11.33
Stewartii	4	0.1	1.75
Sweetgum,seedless	6	0.1	2.33
Turkish Hazelnut	6	0.1	2
Walnut, Black	15	0.3	13.33
Willow Species	3	0.1	8
Willow, Weeping	2	>0.1	18
Witch Hazel	1	>0.1	1
Yellow-wood	16	0.3	2.06
Zelkova	19	0.4	3.42

Table 2. Frequency of Predominant Genera. Genera representing 1% or more of city trees (street and park).

Genus	Number of Trees	% of City Total
<i>Acer</i>	1244	27
<i>Quercus</i>	594	12.9
<i>Malus</i>	291	6.3
<i>Liquidambar</i>	269	5.8
<i>Cornus</i>	263	5.7
<i>Fraxinus</i>	190	4.1
<i>Platanus</i>	170	3.7
<i>Crataegus</i>	135	2.9
<i>Gleditsia</i>	108	2.3
<i>Pyrus</i>	103	2.2
<i>Liriodendron</i>	75	1.6
<i>Prunus</i>	73	1.6
<i>Ginkgo</i>	62	1.3
<i>Koelreuteria</i>	59	1.3
<i>Shrub</i>	61	1.3
<i>Syringa</i>	59	1.3
<i>Amelanchier</i>	57	1.2
<i>Tilia</i>	56	1.2
Others (< 1%)	639	13.5

Figure 2. Frequency of Predominant Genera. Data from Table 2.

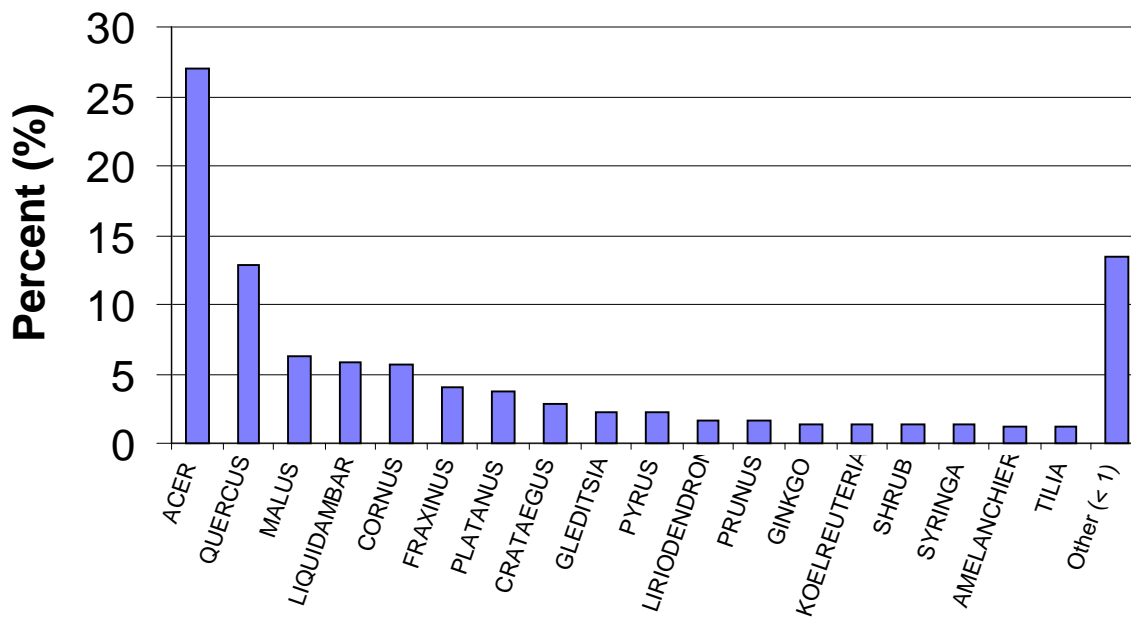


Table 2A. Frequency of Secondary Genera. Genera representing less than 1% of city trees (street and park).

Genus	Number of Trees	% of City Trees
<i>Aesculus</i>	24	0.5
<i>Albizia</i>	12	0.2
<i>Alnus</i>	5	0.1
<i>Aralia</i>	4	0.1
<i>Betula</i>	23	0.5
<i>Carpinus</i>	34	0.7
<i>Carya</i>	2	< 0.1
<i>Cedrus</i>	3	0.1
<i>Celtis</i>	25	0.5
<i>Cercidiphyllum</i>	15	0.3
<i>Cercis</i>	9	0.2
<i>Chionanthus</i>	14	0.3
<i>Cladrastis</i>	16	0.3
<i>Corylus</i>	6	0.1
<i>Cotinus</i>	2	< 0.1
<i>Diospyros</i>	5	0.1
<i>Eucommia</i>	33	0.7
<i>Fagus</i>	9	0.2
<i>Franklinia</i>	3	0.1
<i>Gymnocladus</i>	29	0.6
<i>Halesia</i>	4	0.1
<i>Hamamelis</i>	1	< 0.1
<i>Hibiscus</i>	1	< 0.1
<i>Ilex</i>	27	0.6
<i>Juglans</i>	15	0.3
<i>Juniperus</i>	2	< 0.1
<i>Larix</i>	1	< 0.1
<i>Magnolia</i>	40	0.9
<i>Metasequoia</i>	17	0.4
<i>Morus</i>	3	0.1
<i>Nyssa</i>	32	0.7
<i>Ostrya</i>	3	0.1
<i>Oxydendrum</i>	30	0.7
<i>Parrotia</i>	8	0.2
<i>Paulownia</i>	1	< 0.1
<i>Picea</i>	12	0.3
<i>Pinus</i>	17	0.4
<i>Populus</i>	11	0.2
<i>Robinia</i>	2	< 0.1
<i>Salix</i>	5	0.1
<i>Sassafras</i>	13	0.3
<i>Sophora</i>	4	0.1
<i>Stewartia</i>	4	0.1
<i>Taxodium</i>	34	0.7
<i>Thuja</i>	2	< 0.1
<i>Tsuga</i>	6	0.1
<i>Ulmus</i>	26	0.6
<i>Viburnum</i>	4	0.1
<i>Zelkova</i>	20	0.4

Table 3. Frequency of Predominant Park Species. Species representing more than 1% of park trees.

Common	Number of Trees	% of Park Total	Avg DBH (in.)
Crabapple*	117	17.6	4.3
Maple, Silver	77	11.6	13.51
American Sycamore	51	7.7	11.78
Sweetgum	44	6.6	16.23
Dogwood, Flowering	42	6.3	5.17
Ash (White and Green)	34	4.6	16.8
Maple, Red	28	4.2	8.71
Maple, Sugar	21	3.2	17
Oak, Pin	15	2.3	12.8
Buckeye, Yellow	14	2.1	5.29
Oak, Northern Red	14	2.1	8.93
Tulip Tree	12	1.8	20.25
Pear*	9	1.4	4.89
Birch, River	8	1.2	2.63
Cottonwood, Eastern	7	1.1	26.57
Walnut, Black	7	1.1	16
Others (< 1%)	167	27.4	6.45

*all; mixed species and varieties

Figure 3. Frequency of Predominant Park Species. Data from Table 3.

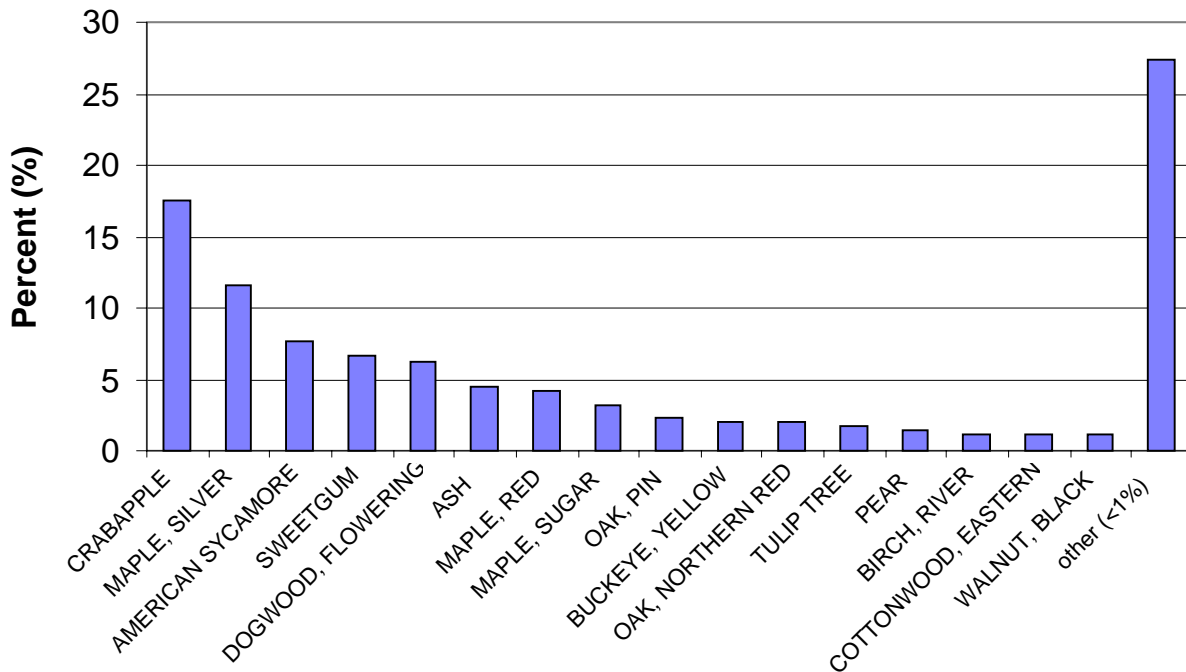


Table 3A. Frequency of Park Secondary Species. Species representing less than 1% of park trees.

Common	Number of Trees	% of park Records	Avg DBH (in.)
Alder, European	1	0.2	2
Apple	4	0.6	5
Baldcypress	2	0.3	6
Beech	3	0.5	2.33
Beech, American	1	0.2	1
Beech, European	1	0.2	5
Birch	1	0.2	2
Black Locust	2	0.3	14
Blackgum	4	0.6	2
Boxelder	1	0.2	16
Buckeye, Ohio	2	0.3	6
Cherry, Black	1	0.2	15
Cherry, Other	3	0.5	14.33
Cucumber Tree	1	0.2	12
Dawn Redwood	1	0.2	2
Devils Walking Stick	4	0.6	1
Dogwood, Kousa	4	0.6	5
Eastern Hophornbeam	1	0.2	2
Eastern Redbud	2	0.3	16
Eastern Redcedar	1	0.2	5
Elm	1	0.2	8
Elm, American	1	0.2	1
Fringe Tree	2	0.3	2.5
Ginkgo	2	0.3	2
Goldenrain Tree	3	0.5	4.67
Hackberry	6	0.9	13.17
Hawthorn	5	0.8	2.4
Hemlock, Eastern	6	0.9	15.5
Holly, American	1	0.2	7
Honeylocust	6	0.9	9.67
Horsechestnut	2	0.3	2
Japanese Pagoda Tree	1	0.2	10
Japanese Tree Lilac	1	0.2	2
Katsura Tree	2	0.3	2
Kentucky Coffeetree	6	0.9	9.33
Linden, American	4	0.6	8
Magnolia	3	0.5	7.33
Magnolia, Saucer	2	0.3	10.5
Magnolia, Southern	1	0.2	8
Magnolia, Sweetbay	1	0.2	2

Table 3A, cont. Frequency of Park Secondary Species. Species representing less than 1% of park trees.

Common	Number of Trees	% of park Records	Avg DBH (in.)
Maple, Japanese	1	0.2	2
Maple, Norway	2	0.3	14
Maple, Norway-cr Kng	4	0.6	9.5
Mimosa	2	0.3	3.5
Mulberry, Red	1	0.2	10
Mulberry, White	2	0.3	15
Oak, Black	1	0.2	2
Oak, English	1	0.2	2
Oak, Sawtooth	1	0.2	2
Oak, Shingle	1	0.2	2
Oak, Shumard	1	0.2	2
Oak, Swamp White	4	0.6	2
Oak, White	2	0.3	8
Oak, Willow	5	0.8	8.2
Paulownia	1	0.2	48
Peach	2	0.3	2
Pine	2	0.3	9
Pine, Eastern White	3	0.5	10
Plum, American	2	0.3	2
Sassafras	1	0.2	2
Serviceberry	1	0.2	5
Silverbell	1	0.2	2
Spruce	3	0.5	4
Stewartii	1	0.2	1
Unknown	3	0.5	1
Willow Species	1	0.2	8
Willow, Weeping	2	0.3	18
Witch Hazel	1	0.2	1
Yellow-wood	3	0.5	2.33

Table 4. Size Frequency of City Trees

DBH Range	Number of Trees
1 to 3 inches	1109
4 to 6	434
7 to 9	335
10 to 12	264
13 to 15	229
16 to 18	210
19 to 21	162
22 to 24	111
25 to 27	75
28 to 30	49
31 to 33	28
34 to 36	15
37 to 39	18
40 to 42	33
43 to 45	17
46 to 48	7
49 to 51	10
55 to 57	2

Figure 4. Size Frequency of City Trees. Data from Table 4.

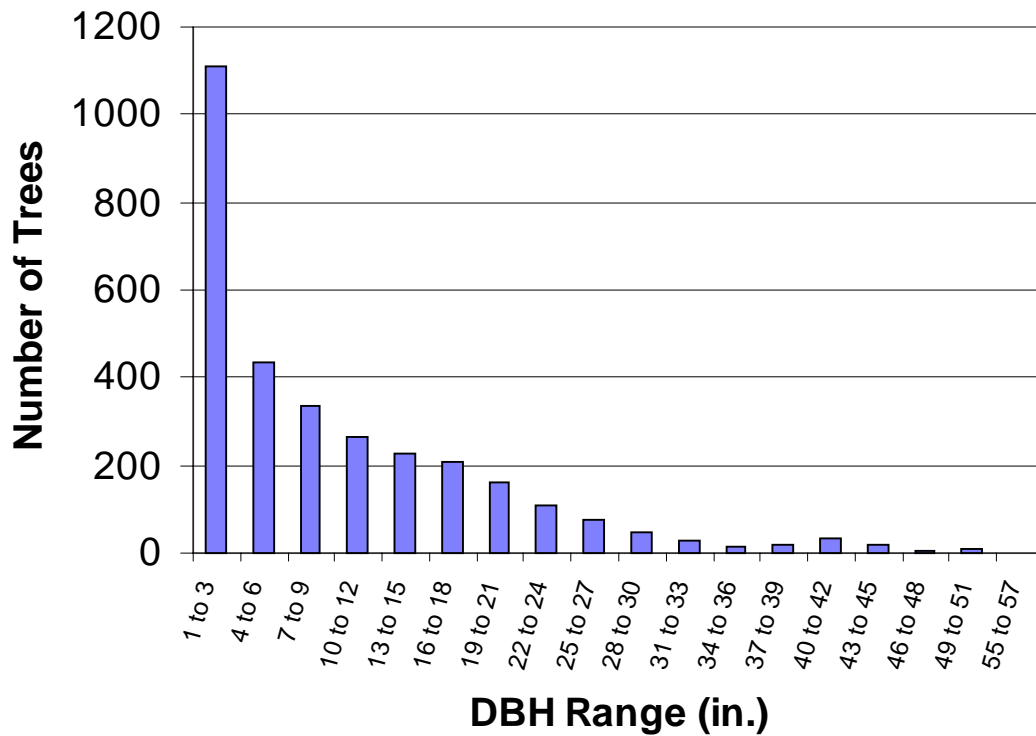


Figure 5. Size Frequencies for Selected Species. Data from Table 5.

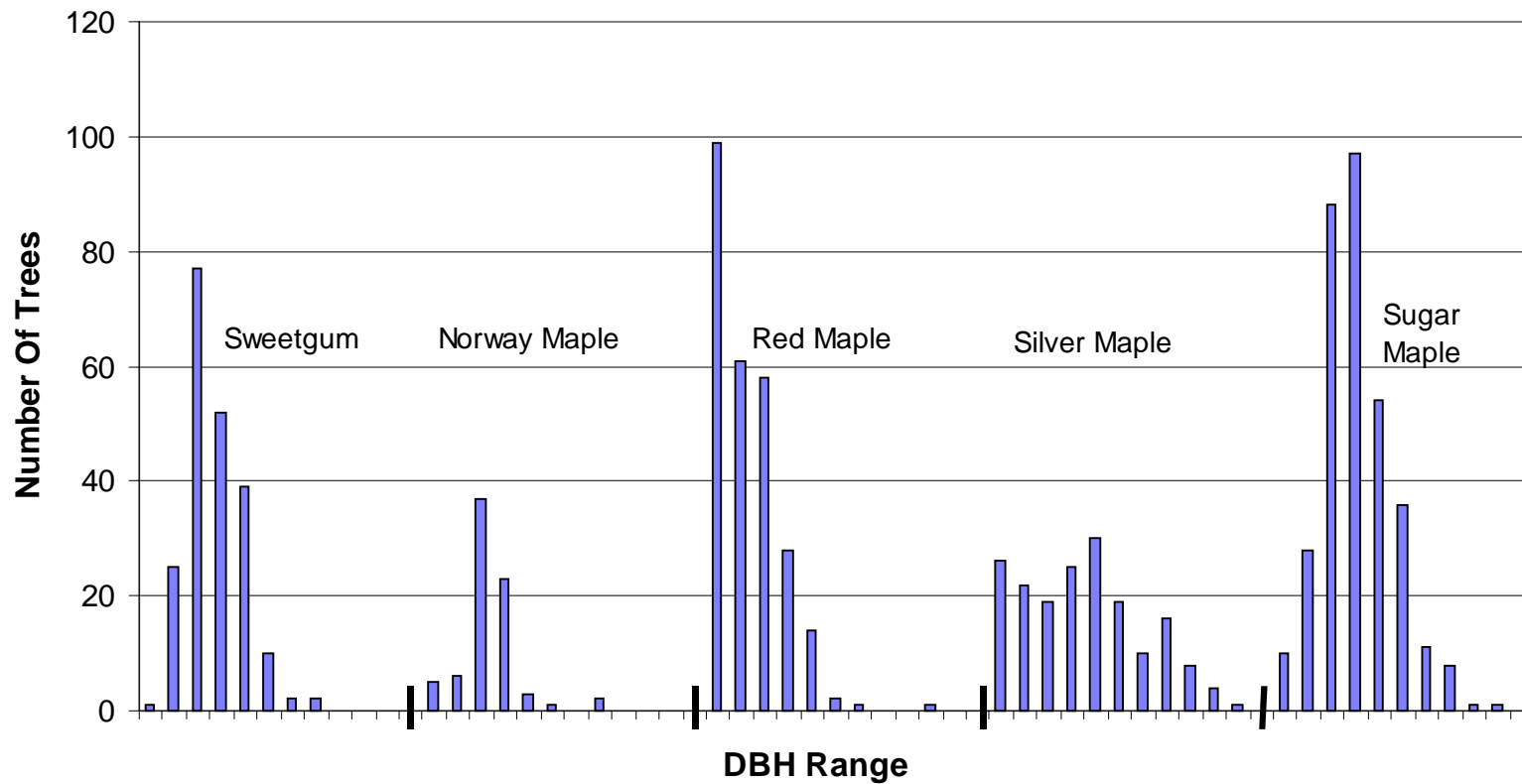


Figure 5A. Size Frequencies for Selected Species. Data from Table 5.

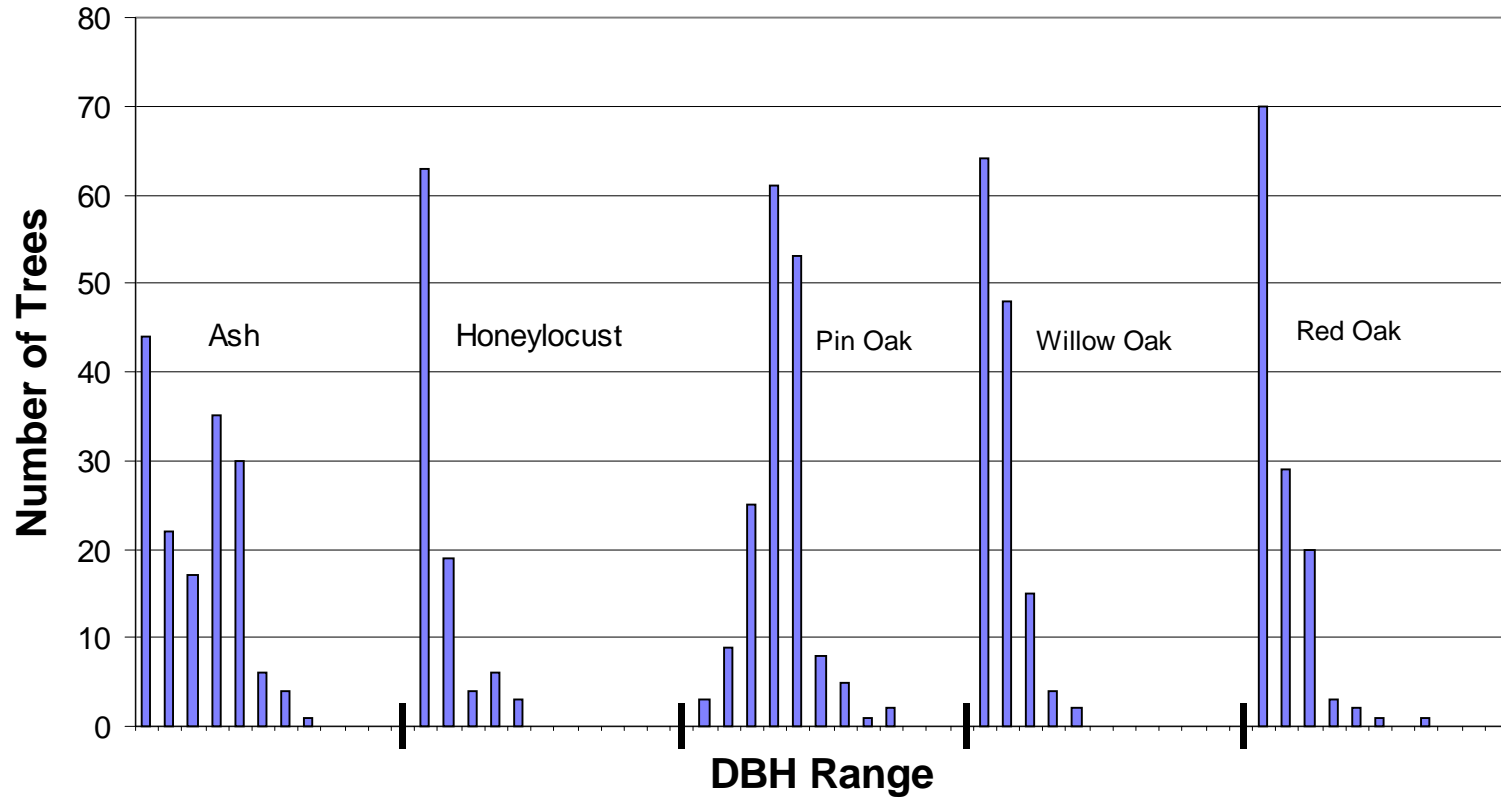


Figure 5B. Size Frequencies for Selected Species. Data from Table 5.

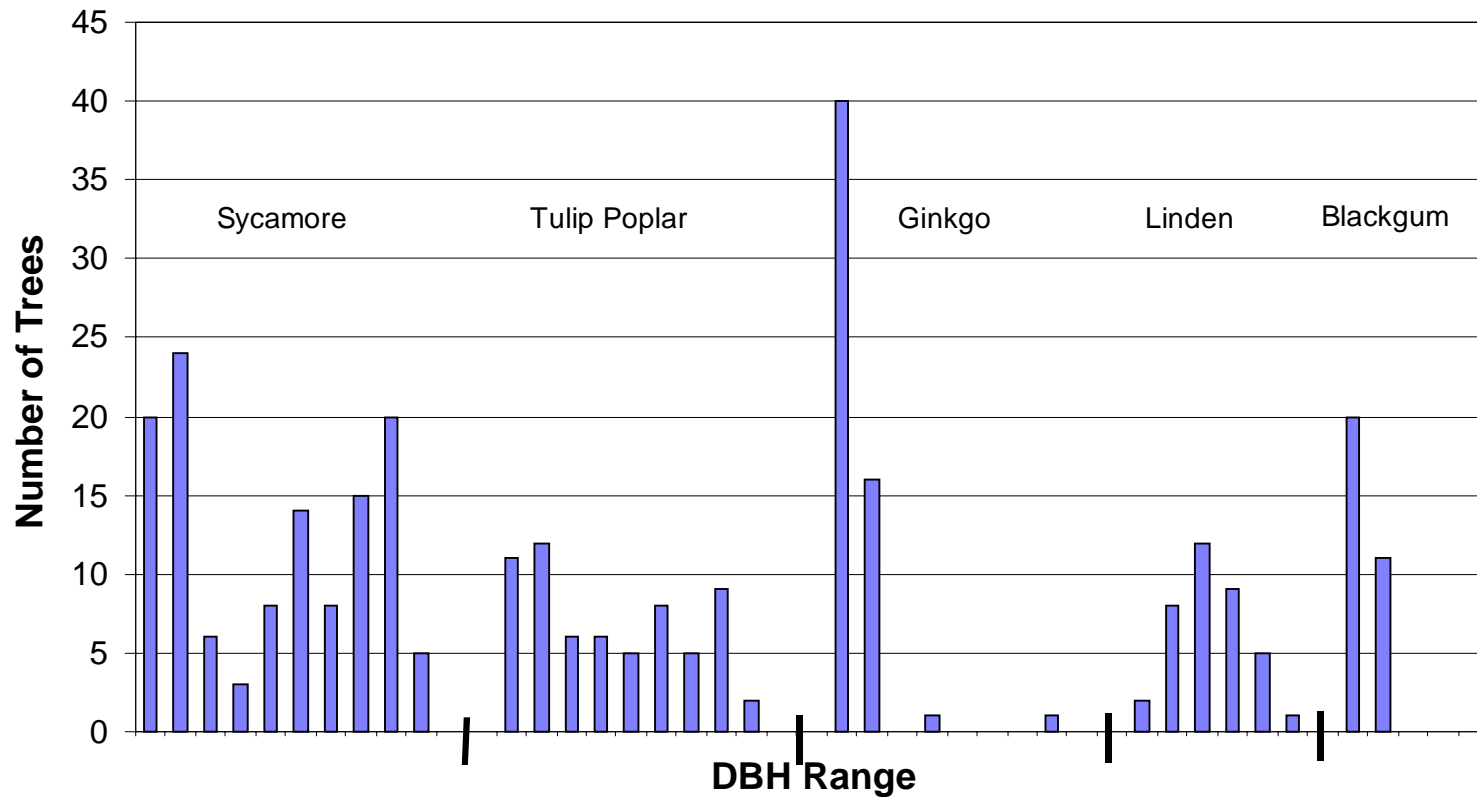


Table 5. DBH Frequency for Selected Species. Species include predominant shade trees.

Sweetgum		Ash		Red Maple	
<u>DBH range (in.)</u>	<u>#</u>	<u>DBH range (in.)</u>	<u>#</u>	<u>DBH range (in.)</u>	<u>#</u>
1 to 5	1	1 to 5	44	1 to 5	99
6 to 10	25	6 to 10	22	6 to 10	61
11 to 15	77	11 to 15	17	11 to 15	58
16 to 20	52	16 to 20	35	16 to 20	28
21 to 25	39	21 to 25	30	21 to 25	14
26 to 30	10	26 to 30	6	26 to 30	2
31 to 35	2	31 to 35	4	31 to 35	1
36 to 40	2	36 to 40	1	36 to 40	0
41 to 45	0	41 to 45	0	41 to 45	0
46 to 50	0	46 to 50	0	46 to 50	1
51 to 55	0	51 to 55	0	51 to 55	0
Norway maple		Honeylocust		Silver maple	
<u>DBH range (in.)</u>	<u>#</u>	<u>DBH range (in.)</u>	<u>#</u>	<u>DBH range (in.)</u>	<u>#</u>
1 to 5	5	1 to 5	63	1 to 5	26
6 to 10	6	6 to 10	19	6 to 10	22
11 to 15	37	11 to 15	4	11 to 15	19
16 to 20	23	16 to 20	6	16 to 20	25
21 to 25	3	21 to 25	3	21 to 25	30
26 to 30	1	26 to 30	0	26 to 30	19
31 to 35	0	31 to 35	0	31 to 35	10
36 to 40	2	36 to 40	0	36 to 40	16
41 to 45	0	41 to 45	0	41 to 45	8
46 to 50	0	46 to 50	0	46 to 50	4
51 to 55	0	51 to 55	0	51 to 55	1
Willow Oak		Pin Oak		Sugar Maple	
<u>DBH range (in.)</u>	<u>#</u>	<u>DBH range (in.)</u>	<u>#</u>	<u>DBH range (in.)</u>	<u>#</u>
1 to 5	64	1 to 5	3	1 to 5	10
6 to 10	48	6 to 10	9	6 to 10	28
11 to 15	15	11 to 15	25	11 to 15	88
16 to 20	4	16 to 20	61	16 to 20	97
21 to 25	2	21 to 25	53	21 to 25	54
26 to 30	0	26 to 30	8	26 to 30	36
31 to 35	0	31 to 35	5	31 to 35	11
36 to 40	0	36 to 40	1	36 to 40	8
41 to 45	0	41 to 45	2	41 to 45	1
46 to 50	0	46 to 50	0	46 to 50	1
51 to 55	0	51 to 55	0	51 to 55	0

Table 5, cont. DBH Frequency for Selected Species.

Red Oak		Sycamore		Tulip Poplar	
<u>DBH range (in.)</u>	<u>#</u>	<u>DBH range (in.)</u>	<u>#</u>	<u>DBH range (in.)</u>	<u>#</u>
1 to 5	70	1 to 5	20	1 to 5	11
6 to 10	29	6 to 10	24	6 to 10	12
11 to 15	20	11 to 15	6	11 to 15	6
16 to 20	3	16 to 20	3	16 to 20	6
21 to 25	2	21 to 25	8	21 to 25	5
26 to 30	1	26 to 30	14	26 to 30	8
31 to 35	0	31 to 35	8	31 to 35	5
36 to 40	1	36 to 40	15	36 to 40	9
41 to 45	0	41 to 45	20	41 to 45	2
46 to 50	0	46 to 50	5	46 to 50	0
51 to 55	0	51 to 55	0		

Ginkgo		Linden		Blackgum	
<u>DBH range (in.)</u>	<u>#</u>	<u>DBH range (in.)</u>	<u>#</u>	<u>DBH range (in.)</u>	<u>#</u>
1 to 5	40	1 to 5	2	1 to 5	20
6 to 10	16	6 to 10	8	6 to 10	11
11 to 15	0	11 to 15	12	11 to 15	0
16 to 20	1	16 to 20	9	16 to 20	0
21 to 25	0	21 to 25	5	21 to 25	0
26 to 30	0	26 to 30	1		
31 to 35	0				
36 to 40	1				
41 to 45	0				

Table 6. Total Number of Trees Planted. These data include trees paid for by the city and donated by residents.

Year	Number planted
1987	72
1991	83
1992	111
1993	92
1994	226
1995	148
1996	180
1997	195
1998	255
1999	221
2000*	39
Total	1622

*2000 only includes spring plantings

Figure 6. Number of Trees planted by year. Data from Table 6.

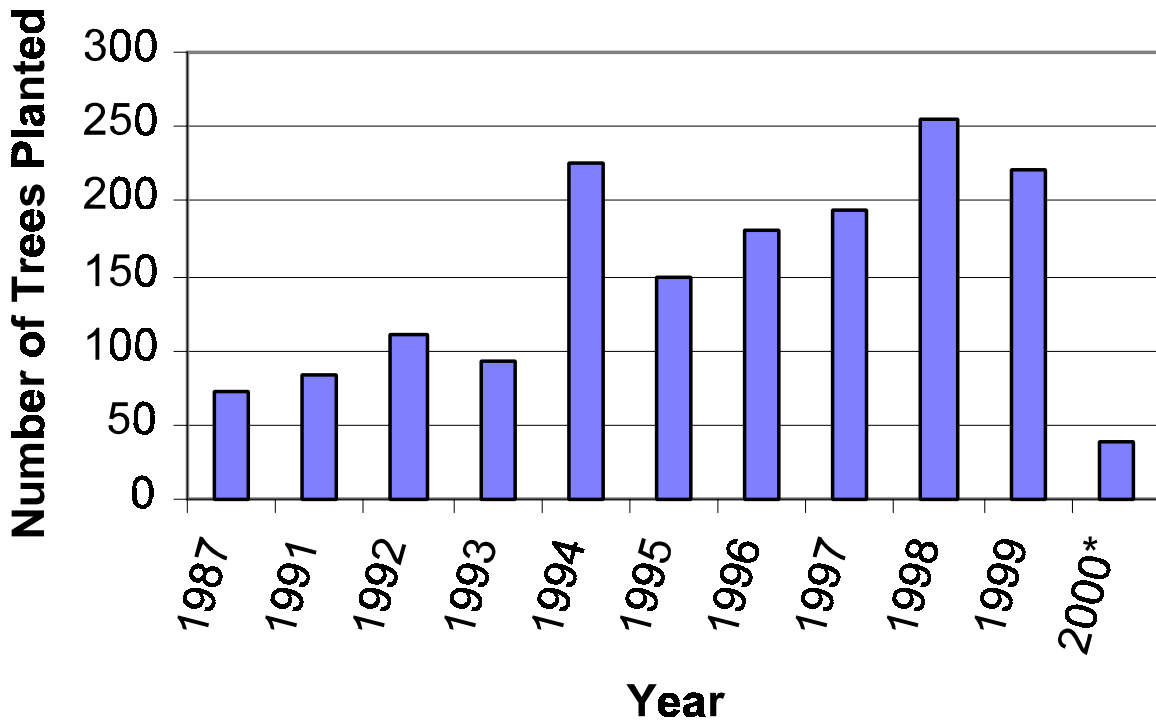


Table 7. Survival of Planted Tree Species – Ordered by % Survival. Data are for trees planted before January 1, 1999 and recorded as dead by July 2000.

Common Name	% survival	# planted	# dead
Buckeye, Yellow	100.0	10	0
Parrotia	100.0	8	0
Crabapple, Prairiefi	94.2	86	5
Kentucky Coffeetree	92.0	25	2
Oak, Swamp White	91.7	24	2
Katsura Tree	90.5	21	2
Maple, Paperbark	90.0	10	1
Japanese Zelkova	89.5	19	2
Hardy Rubber Tree	88.2	17	2
Hackberry	87.5	16	2
Honeylocust	86.8	53	7
Magnolia	85.7	14	2
Ginkgo	83.3	30	5
Oak, Willow	83.3	84	14
Pear	82.1	39	7
Oak, Other Species	81.3	16	3
Yellow-wood	81.3	16	3
Dogwood, Kousa	80.0	10	2
Japanese Tree Lilac	79.4	34	7
Maple, Red	79.4	102	21
Ash (White and Green)	76.6	47	11
Baldcypress	76.0	25	6
Crabapple	75.7	70	17
Maple, Other	75.0	16	4
Serviceberry	74.5	47	12
Goldenrain Tree	74.2	31	8
Cherry	74.1	27	7
Oak, Northern Red	73.2	71	19
Maple, Norway-cr Kng	70.6	17	5
Oak, Scarlet	70.0	10	3
Hornbeam, European	66.7	27	9
Oak, Shumard	66.7	12	4
Fringe Tree	64.3	14	5
Plum, Flowering	64.3	14	5
Tulip Tree	61.5	13	5
Dawn Redwood	60.0	15	6
Oak, Sawtooth	54.5	11	5
Oak, Shingle	54.5	11	5
Blackgum	54.2	24	11
Hawthorn	53.3	90	42
Birch	45.5	11	6
American Sycamore	35.7	14	9
Sassafras	22.2	18	14
Sourwood	12.0	25	22
Eastern Redbud	11.1	9	8

Totals 74.1 1303 337

Table 7A. Survival of Planted Tree Species – Ordered by Species. Data are for trees planted before January 1, 1999 and recorded as dead by July 2000.

Common Name	% survival	# planted	# dead
American Sycamore	35.7	14	9
Ash (White and Green)	76.6	47	11
Baldcypress	76.0	25	6
Birch	45.5	11	6
Blackgum	54.2	24	11
Buckeye, Yellow	100.0	10	0
Cherry	74.1	27	7
Crabapple	75.7	70	17
Crabapple, Prairiefi	94.2	86	5
Dawn Redwood	60.0	15	6
Dogwood, Kousa	80.0	10	2
Eastern Redbud	11.1	9	8
Fringe Tree	64.3	14	5
Ginkgo	83.3	30	5
Goldenrain Tree	74.2	31	8
Hackberry	87.5	16	2
Hardy Rubber Tree	88.2	17	2
Hawthorn	53.3	90	42
Honeylocust	86.8	53	7
Hornbeam, European	66.7	27	9
Japanese Tree Lilac	79.4	34	7
Japanese Zelkova	89.5	19	2
Katsura Tree	90.5	21	2
Kentucky Coffeetree	92.0	25	2
Magnolia	85.7	14	2
Maple, Norway-cr Kng	70.6	17	5
Maple, Other	75.0	16	4
Maple, Paperbark	90.0	10	1
Maple, Red	79.4	102	21
Oak, Northern Red	73.2	71	19
Oak, Other Species	81.3	16	3
Oak, Sawtooth	54.5	11	5
Oak, Scarlet	70.0	10	3
Oak, Shingle	54.5	11	5
Oak, Shumard	66.7	12	4
Oak, Swamp White	91.7	24	2
Oak, Willow	83.3	84	14
Parrotia	100.0	8	0
Pear	82.1	39	7
Plum, Flowering	64.3	14	5
Sassafras	22.2	18	14
Serviceberry	74.5	47	12
Sourwood	12.0	25	22
Tulip Tree	61.5	13	5
Yellow-wood	81.3	16	3
Totals	74.1	1303	337

Figure 7. Percent Survival for Species with 20 or more individuals planted.
 Data taken from Table 7.

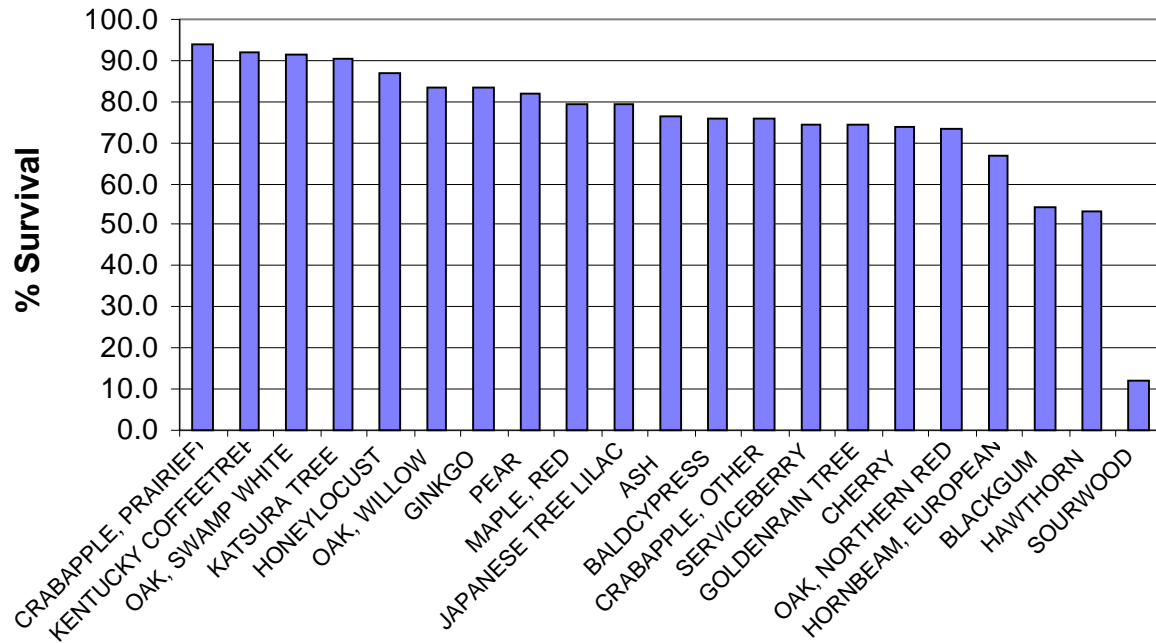


Table 8. Removed Trees. Data shows the number of trees removed from streets and parks. Species listed only for those representing 1% or more of trees removed.

Common	Number of Trees	Percent	Avg DBH (in.)
Maple, Sugar	83	7.1	20.3
Hawthorn	52	4.4	2.46
Maple, Red	49	4.2	9.14
Sweetgum	45	3.8	17.56
Maple, Silver	33	2.8	27.82
Ash (White and Green)	31	2.6	9
Dogwood, Flowering	28	2.4	4.36
American Sycamore	26	2.2	20.04
Sourwood	26	2.2	1.38
Crabapple	25	2.1	3.12
Hornbeam, European	24	2	3.83
Oak, Northern Red	19	1.6	1.63
Oak, Willow	19	1.6	2.32
Katsura Tree	18	1.5	1.67
Pear	18	1.5	5
Honeylocust	17	1.5	5.29
Sassafras	16	1.4	1.63
Oak, Pin	15	1.3	20.33
Serviceberry	15	1.3	2.67
Blackgum	14	1.2	1.57
Maple, Norway	14	1.2	15.14
Cherry, Other	12	1	4.83
Maple, Norway 'Crimson King'	12	1	7.58
Tulip Tree	12	1	14.58
Other (< 1)	210	18.7	5.78

Figure 8. Removed trees. Data from Table 8.

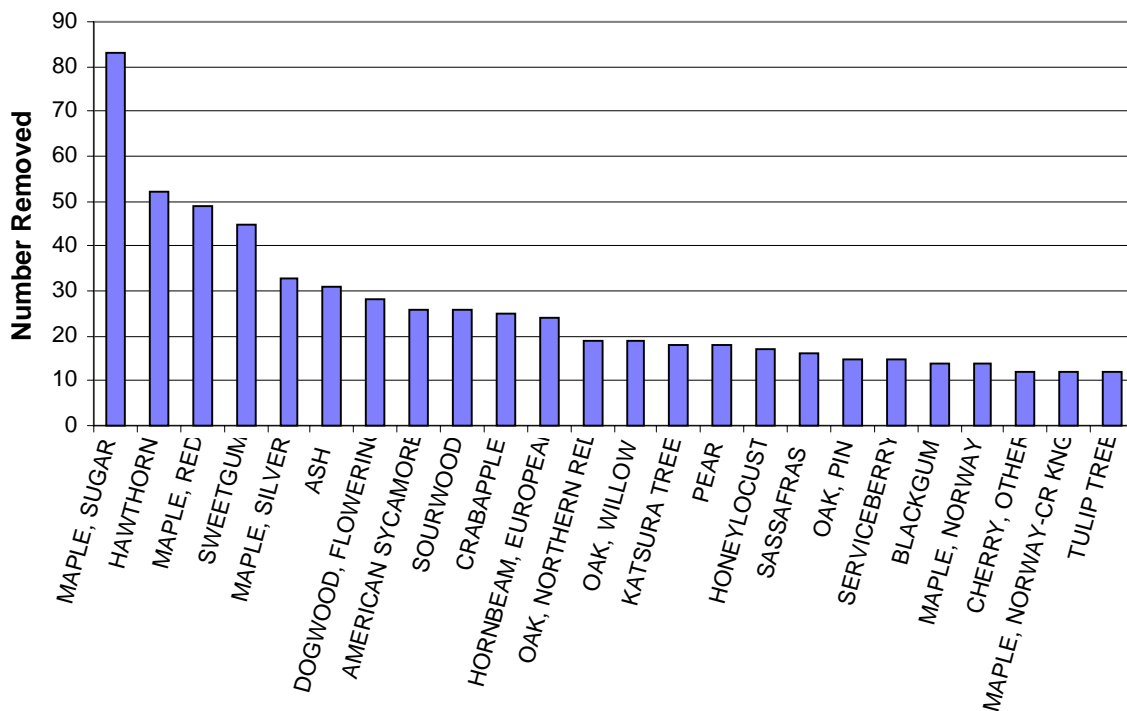


Table 9. Summary of Tree Planting Costs. Data only for trees paid for by the city (i.e., do not include donation and memorial trees paid for by residents, or warranty replacements). Year 2000 only includes spring plantings.

<u>Year</u>	<u>Number Planted</u>	<u>Avg Cost</u>
1987	72	83.19
1991	83	80.72
1992	109	72.35
1993	92	98.18
1994	217	88.15
1995	140	83.88
1996	172	98.96
1997	173	114.67
1998	225	121.05
1999	173	119.94
2000	7	140.64

Figure 9. Average Cost of Tree Plantings. Planting cost includes installation. Year 2000 only includes spring plantings.

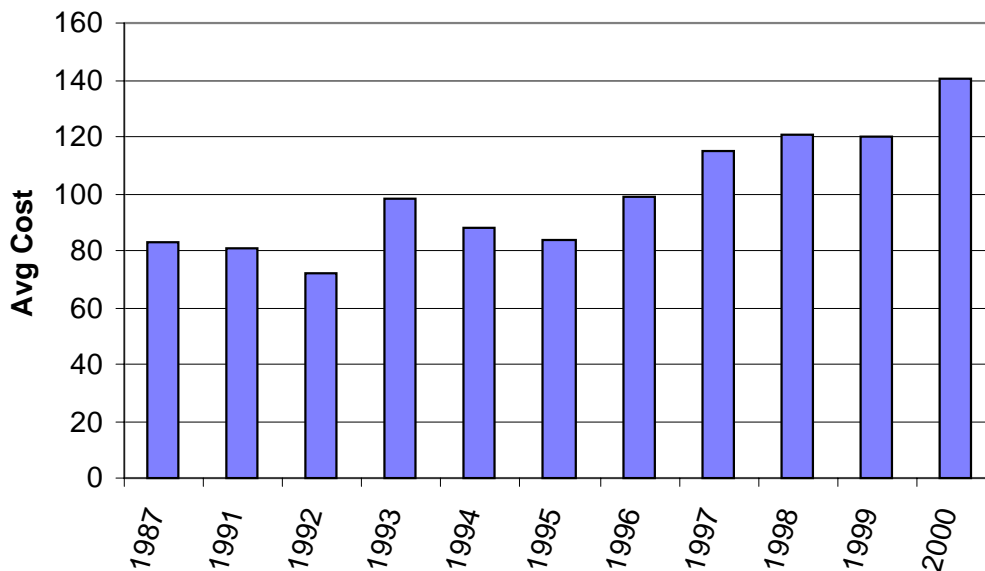


Table 10. Summary of Tree Maintenance Costs. Planting data inventoried since 1987. Other work histories inventoried since 1996. Pruning data do not include maintenance contracted on a city-block basis.

<u>Type</u>	<u>Number of Work Histories</u>	<u>Sum of Work History Cost</u>	<u>Avg Cost</u>
Fertilize	38	\$540.00	\$14.21
Remove Hanger	44	\$2,310.00	\$56.34
Plant	1640	\$147,193.02	\$92.52
Prune	375	\$41,293.92	\$112.21
Remove Tree	672	\$30,996.00	\$69.97

Table 11. Planted trees according to final mature size.

<u>Mature Size*</u>	<u>Number Planted</u>
Large	787
Medium	264
Small	582
*Small	< 25 ft height
Medium	25 - 50 ft height
Large	> 50 ft height

Table 12. Location of remaining American elm trees.

<u>Address</u>	<u>Site</u>	<u>Serial #</u>
510 Eighth St	17	6364
625 Eighth St	1	4603
708 Eighth St	1	4984
622 Fifth St	1	4415
600 Fourth St	8	119
144 Harmar St	1 (side of lot)	6028
407 Harmar St	1	5400
636 Ninth St	2	4344
215 Ohio St	1 (side of lot)	3273
100 Sacra Via West (Park)	18	6567
701 Second St	2	4831
529 Third St	1	5017
801 Third St	1	4763
101 Washington St	1 (side of lot)	1760
212 Washington St	1	5155

Appendix A
Tree common and scientific names.

<u>Common Name</u>	<u>Genus</u>	<u>Species</u>
Alder, European	<i>Alnus</i>	<i>glutinosa</i>
American Sycamore	<i>Platanus</i>	<i>occidentalis</i>
Apple	<i>Malus</i>	<i>pumila</i>
Arborvitae, American	<i>Thuja</i>	<i>occidentalis</i>
Ash, green	<i>Fraxinus</i>	<i>pennsylvanica</i>
Ash, White	<i>Fraxinus</i>	<i>americana</i>
Baldcypress	<i>Taxodium</i>	<i>distichum</i>
Beech, American	<i>Fagus</i>	<i>grandifolia</i>
Beech, European	<i>Fagus</i>	<i>sylvatica</i>
Birch	<i>Betula</i>	<i>species</i>
Birch, Paper	<i>Betula</i>	<i>papyrifera</i>
Birch, River	<i>Betula</i>	<i>nigra</i>
Black Locust	<i>Robinia</i>	<i>pseudoacacia</i>
Blackgum	<i>Nyssa</i>	<i>sylvatica</i>
Blackhaw Viburnum	<i>Viburnum</i>	<i>prunifolium</i>
Boxelder	<i>Acer</i>	<i>negundo</i>
Buckeye, Ohio	<i>Aesculus</i>	<i>glabra</i>
Buckeye, Yellow	<i>Aesculus</i>	<i>octandra</i>
Cedar, Atlas	<i>Cedrus</i>	<i>atlantica</i>
Cherry, Black	<i>Prunus</i>	<i>serotina</i>
Cherry, Kwanzan	<i>Prunus</i>	<i>serrulata</i>
Cherry	<i>Prunus</i>	<i>species</i>
Cottonwood, Eastern	<i>Populus</i>	<i>deltoides</i>
Crabapple	<i>Malus</i>	<i>species</i>
Cucumber Tree	<i>Magnolia</i>	<i>acuminata</i>
Dawn Redwood	<i>Metasequoia</i>	<i>glyptostrobooides</i>
Devils Walking Stick	<i>Aralia</i>	<i>spinosa</i>
Dogwood, Flowering	<i>Cornus</i>	<i>florida</i>
Dogwood, Kousa	<i>Cornus</i>	<i>kousa</i>
Eastern Hophornbeam	<i>Ostrya</i>	<i>virginiana</i>
Eastern Redbud	<i>Cercis</i>	<i>canadensis</i>
Eastern Redcedar	<i>Juniperus</i>	<i>virginiana</i>
Elm, American	<i>Ulmus</i>	<i>americana</i>
Elm, Chinese	<i>Ulmus</i>	<i>parvifolia</i>
Elm, Slippery	<i>Ulmus</i>	<i>rubra</i>
Franklin Tree	<i>Franklinia</i>	<i>alatomaha</i>
Fringe Tree	<i>Chionanthus</i>	<i>virginicus</i>
Ginkgo	<i>Ginkgo</i>	<i>biloba</i>
Goldenrain Tree	<i>Koelreuteria</i>	<i>paniculata</i>
Hackberry	<i>Celtis</i>	<i>occidentalis</i>

Appendix A, con't.
Tree common and scientific names

<u>Common Name</u>	<u>Genus</u>	<u>species</u>
Hardy Rubber Tree	<i>Eucommia</i>	<i>ulmoides</i>
Hawthorn	<i>Crataegus</i>	<i>species</i>
Hemlock, Eastern	<i>Tsuga</i>	<i>canadensis</i>
Hickory, Shagbark	<i>Carya</i>	<i>ovata</i>
Holly, American	<i>Ilex</i>	<i>opaca</i>
Honeylocust	<i>Gleditsia</i>	<i>triacanthos</i>
Hornbeam, European	<i>Carpinus</i>	<i>betulus</i>
Horsechestnut	<i>Aesculus</i>	<i>hippocastanum</i>
Japanese Pagoda Tree	<i>Sophora</i>	<i>japonica</i>
Japanese Tree Lilac	<i>Syringa</i>	<i>reticulata</i>
Japanese Zelkova	<i>Zelkova</i>	<i>serrata</i>
Katsura Tree	<i>Cercidiphyllum</i>	<i>japonicum</i>
Kentucky Coffeetree	<i>Gymnocladus</i>	<i>dioicus</i>
Larch, European	<i>Larix</i>	<i>sp</i>
Linden, American	<i>Tilia</i>	<i>americana</i>
Linden, Greenspire	<i>Tilia</i>	<i>cordata</i>
London Planetree	<i>Platanus</i>	<i>acerifolia</i>
Magnolia, Saucer	<i>Magnolia</i>	<i>soulangiana</i>
Magnolia, Southern	<i>Magnolia</i>	<i>grandiflora</i>
Magnolia, Star	<i>Magnolia</i>	<i>stellata</i>
Magnolia, Sweetbay	<i>Magnolia</i>	<i>virginiana</i>
Maple	<i>Acer</i>	<i>species</i>
Maple, Amur	<i>Acer</i>	<i>ginnala</i>
Maple, Armstrong	<i>Acer</i>	<i>rubrum</i>
Maple, Black	<i>Acer</i>	<i>nigrum</i>
Maple, Celebration	<i>Acer</i>	<i>rubrum x saccharinum</i>
Maple, Hedge	<i>Acer</i>	<i>campestre</i>
Maple, Japanese	<i>Acer</i>	<i>palmatum</i>
Maple, Norway	<i>Acer</i>	<i>platanoides</i>
Maple, Norway-column	<i>Acer</i>	<i>platanoides</i>
Maple, Norway-cr Kng	<i>Acer</i>	<i>platanoides</i>
Maple, Paperbark	<i>Acer</i>	<i>griseum</i>
Maple, Red	<i>Acer</i>	<i>rubrum</i>
Maple, Silver	<i>Acer</i>	<i>saccharinum</i>
Maple, Sugar	<i>Acer</i>	<i>saccharum</i>
Maple, Sugar-columnr	<i>Acer</i>	<i>saccharum</i>
Maple, Sycamore	<i>Acer</i>	<i>pseudoplatanus</i>
Mimosa	<i>Albizia</i>	<i>julibrissin</i>
Mulberry, Red	<i>Morus</i>	<i>rubra</i>
Mulberry, White	<i>Morus</i>	<i>alba</i>

Appendix A, cont.
Tree common and scientific names

<u>Common Name</u>	<u>Genus</u>	<u>Species</u>
Oak, Black	<i>Quercus</i>	<i>velutina</i>
Oak, Bur	<i>Quercus</i>	<i>macrocarpa</i>
Oak, Chestnut	<i>Quercus</i>	<i>prinus</i>
Oak, English	<i>Quercus</i>	<i>robur</i>
Oak, Northern Red	<i>Quercus</i>	<i>rubra</i>
Oak, Pin	<i>Quercus</i>	<i>palustris</i>
Oak, Sawtooth	<i>Quercus</i>	<i>acutissima</i>
Oak, Scarlet	<i>Quercus</i>	<i>coccinea</i>
Oak, Shingle	<i>Quercus</i>	<i>imbricaria</i>
Oak, Shumard	<i>Quercus</i>	<i>schumardii</i>
Oak, Southern Red	<i>Quercus</i>	<i>falcata</i>
Oak, Swamp Chestnut	<i>Quercus</i>	<i>michauxii</i>
Oak, Swamp White	<i>Quercus</i>	<i>bicolor</i>
Oak, White	<i>Quercus</i>	<i>alba</i>
Oak, Willow	<i>Quercus</i>	<i>phellos</i>
Parrotia	<i>Parrotia</i>	<i>sp</i>
Paulownia	<i>Paulownia</i>	<i>tomentosa</i>
Pawpaw	<i>Asimina</i>	<i>triloba</i>
Peach	<i>Prunus</i>	<i>persica</i>
Pear	<i>Pyrus</i>	<i>sp</i>
Persimmon, Common	<i>Diospyros</i>	<i>virginiana</i>
Pine, Eastern White	<i>Pinus</i>	<i>strobus</i>
Plum, American	<i>Prunus</i>	<i>americana</i>
Plum, Flowering	<i>Prunus</i>	<i>triloba</i>
Plum, Ornamental	<i>Prunus</i>	<i>sp</i>
Plum, Purpleleaf	<i>Prunus</i>	<i>cerasifera</i>
Poplar, Balsam	<i>Populus</i>	<i>balsamifera</i>
Sassafras	<i>Sassafras</i>	<i>albidum</i>
Serviceberry	<i>Amelanchier</i>	<i>species</i>
Silverbell	<i>Halesia</i>	<i>diptera</i>
Smoke Tree	<i>Cotinus</i>	<i>sp</i>
Sourwood	<i>Oxydendrum</i>	<i>arboreum</i>
Spruce	<i>Picea</i>	<i>species</i>
Spruce, Norway	<i>Picea</i>	<i>sp</i>
Stewartia	<i>Stewartia</i>	<i>pseudocammellia</i>
Sweetgum	<i>Liquidambar</i>	<i>styraciflua</i>
Tulip Tree	<i>Liriodendron</i>	<i>tulipifera</i>
Turkish Hazelnut	<i>Corylus</i>	<i>colurna</i>
Walnut, Black	<i>Juglans</i>	<i>nigra</i>
Willow Species	<i>Salix</i>	<i>species</i>
Willow, Corkscrew	<i>Salix</i>	<i>matsudana</i>
Willow, Weeping	<i>Salix</i>	<i>babylonica</i>
Witch Hazel	<i>Hamamelis</i>	<i>virginiana</i>
Yellow-wood	<i>Cladrastis</i>	<i>lutea</i>

Appendix B Grants and Major Donations

Funding Sources

ALLG	(Allegheny Power)
RFA	(Praxair Rotting for America Program)
ODNR	(Ohio Department of Natural Resources)
ODOT	(Ohio Department of Transportation)
SBA	(Small Business Association)
MCF	(Marietta Community Foundation)
OEPA	(Ohio Env'r Protection Agency)
DON	(Donation)

Grants and Donations

1993	ODNR	\$20,000	Urban Forestry grant for large sycamore pruning
1994	ODNR	5,000	Urban Forestry management grant for computer software
	ODOT	1,837	Tree planting around town
	SBA	5,000	Planting of crabapples at Washington St cloverleaf
1995	ODNR	4,000	Tree planting around town
1996	MCF	7,000	Native tree plantings around town
	RFA	2,000	Tree planting in Kiwanis Park
1997	MCF	3,000	Tree planting along Front St.
	RFA	500	Tree planting around town
	DON	2000	G. Cranston memorial fund for tree plantings around town
1998	OEPA	22,500	MIE fund for tree planting around town
	DON	2000	From Mr. Pottmeyer for tree planting around town
	RFA	500	Tree planting around town
	ALLG	1,500	Tree planting along Washington School
1999	RFA	500	Arbor Day Tree & other planting around town
	DON	1,000	From Daughters of the American Revolution for planting buckeye trees in parks
2000	ALLG	1125	Ohio Riverbank planting
	RFA	500	Arbor Day tree and other planting around town
	ODNR	4000	Tree Planting in business districts