

Environmental Benefits Analysis of Trees for the Governor's Residence and Heritage Gardens



T. Davis Sydnor and Sakthi Subburayalu
School of Environment and Natural Resources
and
James Chatfield
Department of Plant Pathology
The Ohio State University



An Analysis of Tree Benefits for the Ohio Governor's Residence and Heritage Garden

EXECUTIVE SUMMARY

An inventory of trees on the grounds and adjacent street trees was conducted by The Ohio State University Extension, Hope Taft, and community volunteers including an Honors History Class at Washington Court House under the direction of Paul LaRue. The inventory or study was done while Ted and Frances Strickland, Gov and First Lady lived in the residence. This information was then analyzed by The Ohio State University's School of Environment and Natural Resources. A total of 101 trees were inventoried to include street trees immediately adjacent to the residence grounds. A common bid price for this service is \$3.00 per tree and thus the inventory represents a savings of \$303 for the volunteers. Most importantly, however, is that the Department of Administrative Services now has a tree inventory that can be used to better manage the tree resource of the executive residence. Benefits mentioned above do not include the value of the subsequent analysis and report. Analysis of the inventory data was done using iTree, a software suite distributed by the USDA Forest Service. The specific program in the iTree suite used to identify benefits was iStreets and is available at no charge should this be desired. This program allows individuals interested in making informed decisions about the community tree resource or to explore many aspects including biodiversity and environmental services values.

A long standing rule of thumb for taxonomic biodiversity is the 10–20–30 guideline which suggests that no more than 10 percent of trees should be from the same species, no more than 20 percent should be from the same genera, and no more than 30 percent should be from the same family. On the residence's grounds, sugar maple exceeds species guidelines while the maple genus also exceeds guidelines (Table 1). One may wish to limit planting additional maples in future plantings. Ash plantings represent only 5 individuals or 5% of the ground's trees. Their intermediate size further minimizes the impact of EAB. However one must remember that any tree that is larger in size and in close proximity to structures may be costly to remove. Larger growing deciduous trees that could be used to replace the ash include the Kentucky coffeetree; Shumard, chinquapin and bur oaks; sycamore, and elms. Large trees produce markedly more environmental benefits.

Under ideal conditions tree numbers among smaller size classes should be stable and then decline as trees reach their mature size and older trees die. Red oaks show a rather desirable distribution in size while sugar maples, cherries, and crabapples are concentrated in mature sizes (Tables 2 and 3). Consider some larger growing trees that live longer and mature at larger sizes such as preferred in a resident preference survey in Toledo, OH. Of course, this should be consistent with the design intent for the residence.

Trees are variable in size at present with more than 50% of the trees less than 18-inch diameter. Importance values as detailed in (Table 4) show that the 1 red oaks and honeylocusts have the same importance value (a measure of canopy cover) as 17 sugar maples. This demonstrates the residence's need for planting larger statured trees whenever possible as the importance value is a measure of the overall contribution of the species to the sum of environmental benefits delivered.

A major benefit of urban trees is their ability to intercept rainfall and reduce storm water runoff (Table 5). Storm water runoff is a major cost for many communities. Columbus, OH is embarking on a multi-billion dollar sewer and storm water upgrade for the community. Trees on the residence grounds and adjacent street trees intercept more than 130 thousand gallons of storm water annually at a savings to the community of 3,637 dollars per year despite the relatively small size of the property.

Carbon sequestration, as reported here, represents the carbon removed from the air and stored in the trees (Table 6). More than 474 thousand pounds or 237 tons of carbon have been stored by the 101 trees over time. The ground's trees currently sequester and avoid nearly 55,330 lbs of CO₂ yearly (Table 8) and would represent carbon credits worth \$415 per year if a carbon trading system were in place and if a system for accounting for them were available for community trees. These are net gain figures and include deductions for tree losses and maintenance. Annual CO₂ benefits vary by species and size but average \$4.11 per tree per year while larger London planetrees average \$20.63 per tree per year or five times as much.

Annual air quality savings (reduced ozone, nitrous and sulfur oxides as well as particulate matter) for the residence trees is \$500 (Table 9). This includes both direct savings (\$120) from the trees and avoided pollution which is much greater at \$460. Avoided pollution is pollution not generated at power source because energy was not required (avoided) by the community. The total annual air quality benefits are discounted by \$81 for the volatile emissions from the trees themselves.

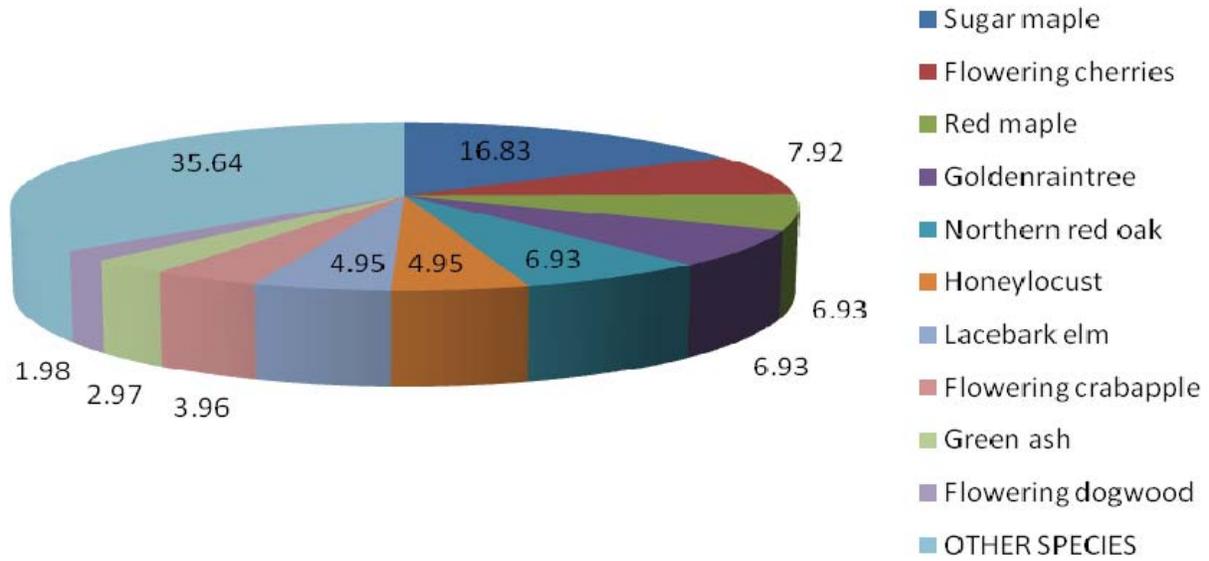
Energy savings by trees are particularly important in view of the citizenry's increasing concern over the nation's energy dependency. Planting trees in our communities may well be more cost effective than building power plants to as a conservation alternative to meeting our energy needs. Energy is saved by shading structures, evaporating water (evapotranspiration) and reducing wind speed around structures (Table 7). The trees at the Ohio Governor's Residence and Heritage Garden save the community \$1,181 in electricity and \$2,053 in natural gas for a total savings of \$3,234 or an average of \$32 per tree per year.

Aesthetic and miscellaneous benefits from trees contribute \$3,867 annually to the community in the form of increased property values and enhanced community identity among other things (Table 10). Research in public housing has shown that areas with trees facilitate interaction among residents and lead to reduced domestic violence and more sociable environments. Customer surveys suggest that customers prefer to spend their money and time in commercial streetscapes with trees and are willing to spend up to 11% more there.

When all benefits are included the 101 trees contribute an average of \$115 per tree annually to the residence and its community (Table 11). Species vary in their annual benefits but mature size, longevity, and maintenance costs are but some of the factors determining annual benefits. Thus the Governor Residence's trees contribute \$11,654 per year. This would be well in excess of their maintenance and planting costs.

The Ohio Governor's Residence and Heritage Garden's budget for trees maintenance was estimated by residence staff as minimal. Much of the plant material is donated and volunteers and staff alike divide duties among a variety of tasks and locations. Thus while the 101 trees on the grounds require minimal care per year they deliver \$11,654 in annual benefits from storm water abatement, CO₂ avoidance and storage, energy savings, air quality, aesthetic benefits, and the like. Returns here may be high but Ohio communities studied routinely discover returns on their tree maintenance dollars of 2-300%. Further, unlike most community infrastructure, annual tree benefits per tree continue to increase over a tree's lifetime.

Table 1. Species Distribution of Trees at the Ohio Governor’s Residence and Heritage Garden Arranged from Most to Least Frequent



Species	Percent
Sugar maple	16.83
Flowering cherries	7.92
Red maple	6.93
Goldenraintree	6.93
Northern red oak	6.93
Honeylocust	4.95
Lacebark elm	4.95
Flowering crabapple	3.96
Green ash	2.97
Flowering dogwood	1.98
OTHER SPECIES	35.64
Total	100.00

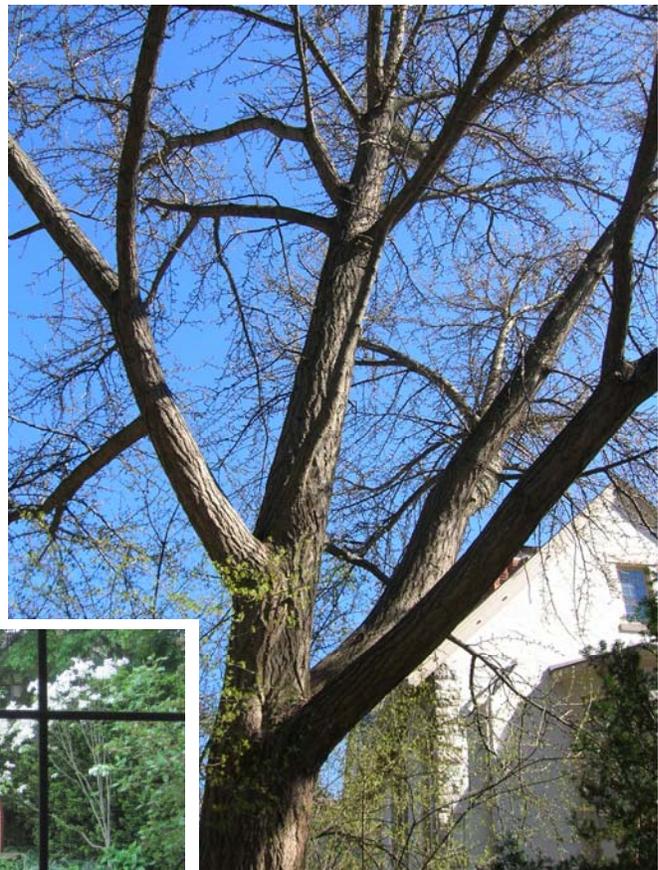
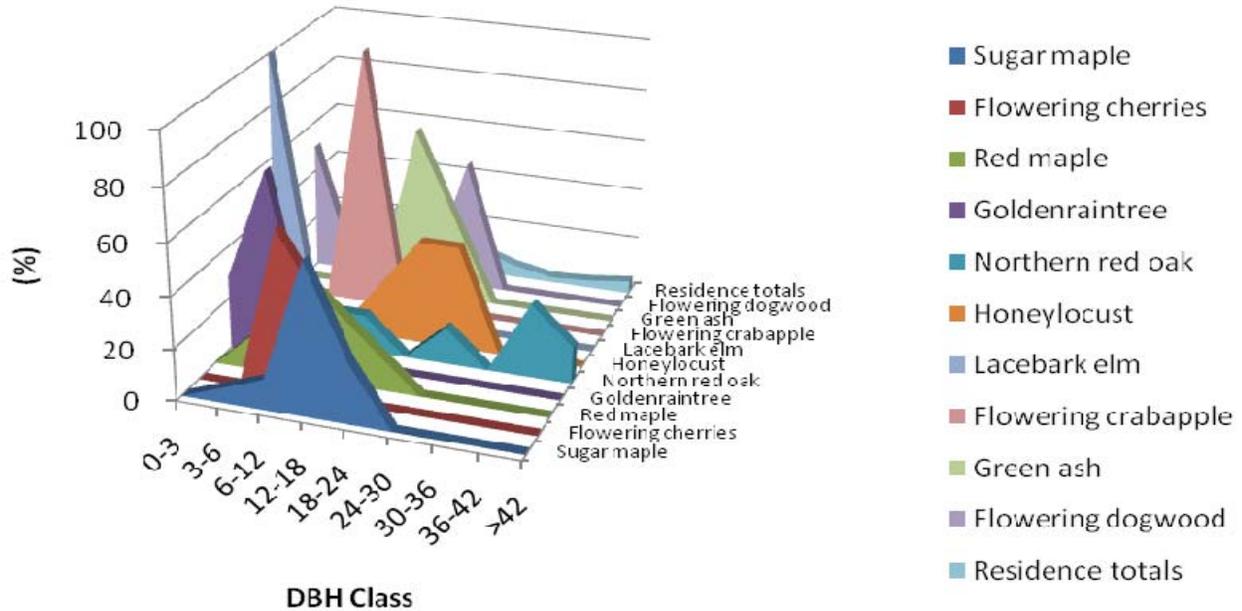


Table 2. Relative Age Distribution of the 10 Most Commonly Planted Trees on the Residence’s Grounds as a Percentage (%) of each Species by Common Names



Species	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	>42
Sugar maple	0	6	12	59	24	0	0	0	0
Flowering cherries	0	0	63	38	0	0	0	0	0
Red maple	0	14	43	29	14	0	0	0	0
Goldenrain tree	29	71	0	0	0	0	0	0	0
Northern red oak	14	0	14	14	0	14	0	29	14
Honeylocust	0	0	0	20	40	40	0	0	0
Lacebark elm	100	0	0	0	0	0	0	0	0
Flowering crabapple	0	0	100	0	0	0	0	0	0
Green ash	0	0	0	67	33	0	0	0	0
Flowering dogwood	50	0	0	0	50	0	0	0	0
Residence Grounds Totals	15	9	26	26	10	5	2	3	5



Table 3. Population of Governor’s Residence Trees by Common Name and Size Class.

Species	DBH Class (in)									Total
	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	>42	
Broadleaf Deciduous Large (BDL)										
Sugar maple	0	1	2	10	4	0	0	0	0	17
Red maple	0	1	3	2	1	0	0	0	0	7
Northern red oak	1	0	1	1	0	1	0	2	1	7
Green ash	0	0	0	2	1	0	0	0	0	3
White ash	0	0	0	2	0	0	0	0	0	2
London planetree	0	0	0	0	0	0	0	0	2	2
BDL OTHER	1	0	1	1	0	0	1	0	1	5
Total	2	2	7	18	6	1	1	2	4	43
Broadleaf Deciduous Medium (BDM)										
Goldenraintree	2	5	0	0	0	0	0	0	0	7
Honeylocust	0	0	0	1	2	2	0	0	0	5
Lacebark elm	5	0	0	0	0	0	0	0	0	5
Littleleaf linden	0	0	0	2	0	0	0	0	0	2
BDM OTHER	1	0	2	1	0	1	0	1	0	6
Total	8	5	2	4	2	3	0	1	0	25
Broadleaf Deciduous Small (BDS)										
Flowering cherries	0	0	5	3	0	0	0	0	0	8
Flowering crabapple	0	0	4	0	0	0	0	0	0	4
Flowering dogwood	1	0	0	0	1	0	0	0	0	2
Apple	0	0	2	0	0	0	0	0	0	2
Cherry plum	2	0	0	0	0	0	0	0	0	2
BDS OTHER	1	0	6	0	0	0	0	0	1	8
Total	4	0	17	3	1	0	0	0	1	26
Broadleaf Evergreen Medium (BEM)										
BEM OTHER	0	1	0	0	0	0	0	0	0	1
Total	0	1	0	0	0	0	0	0	0	1
Conifer Evergreen Large (CEL)										
CEL OTHER	1	1	0	0	1	1	1	0	0	5
Total	1	1	0	0	1	1	1	0	0	5



Species	DBH Class (in)									
	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	>42	Total
Conifer Evergreen Medium (CEM)										
CEM OTHER	0	0	0	1	0	0	0	0	0	1
Total	0	0	0	1	0	0	0	0	0	1
Governor's Residence Total	15	9	26	26	10	5	2	3	5	101



Table 4. Importance Values Listed by Common Name from Greatest to Least Canopy Cover and/or Importance Value.

Species	Number of Trees	% of Total Trees	Leaf Area (ft ²)	% of Total Leaf Area	Canopy Cover (ft ²)	% Total Canopy Cover	Importance Value
Sugar maple	17	16.8	37938	16.5	14378	21.0	18.1
Honeylocust	5	5.0	35564	15.4	8553	12.5	10.9
Northern red oak	7	6.9	23019	10.0	6135	8.9	8.6
London planetree	2	2.0	28839	12.5	4799	7.0	7.2
Red maple	7	6.9	11428	5.0	4896	7.1	6.3
Flowering cherries	8	7.9	3376	1.5	3604	5.3	4.9
Green ash	3	3.0	8258	3.6	2867	4.2	3.6
Goldenraintree	7	6.9	1038	0.5	600	0.9	2.8
White ash	2	2.0	4835	2.1	1788	2.6	2.2
Flowering crabapple	4	4.0	872	0.4	1264	1.8	2.1
Littleleaf linden	2	2.0	3581	1.6	1266	1.8	1.8
Lacebark elm	5	5.0	7	0.0	47	0.1	1.7
Flowering dogwood	2	2.0	1744	0.8	987	1.4	1.4
Apple	2	2.0	436	0.2	632	0.9	1.0
Cherry plum	2	2.0	3	0.0	23	0.0	0.7
Other trees	26	25.7	69672	30.2	16716	24.4	26.8
Governor's Residence Total	101	100.0	230611	100.0	68556	100.0	100.0

Landscape Master Plan

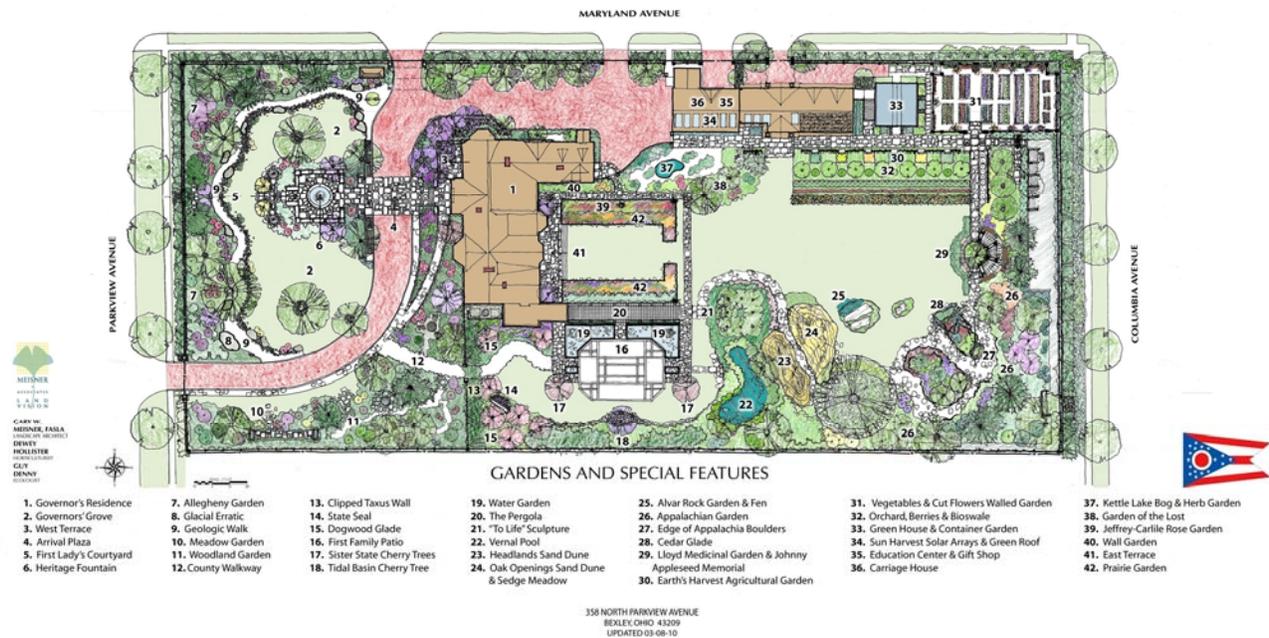


Table 5. Annual Storm Water Benefits of Governor’s Residence Trees by Species Ordered by Decreasing Benefits/Tree

Species	Total Rainfall Interception (Gal)	Total (\$)	% of Total Tree Numbers	% of Total \$	Avg. \$/tree
London planetree	13908	\$377	2.0	10.4	\$188.46
Honeylocust	16736	\$454	5.0	12.5	\$90.71
Northern red oak	13861	\$376	6.9	10.3	\$53.67
Green ash	5521	\$150	3.0	4.1	\$49.88
White ash	3325	\$90	2.0	2.5	\$45.05
Sugar maple	24769	\$671	16.8	18.5	\$39.49
Littleleaf linden	2519	\$68	2.0	1.9	\$34.14
Red maple	8087	\$219	6.9	6.0	\$31.31
Flowering dogwood	1181	\$32	2.0	0.9	\$16.01
Flowering cherries	3322	\$90	7.9	2.5	\$11.25
Flowering crabapple	1058	\$29	4.0	0.8	\$7.17
Apple	529	\$14	2.0	0.4	\$7.17
Goldenraintree	894	\$24	6.9	0.7	\$3.46
Lacebark elm	40	\$1	5.0	0.0	\$0.22
Cherry plum	15	\$0	2.0	0.0	\$0.20
Other trees	38426	\$1,041	25.7	28.6	\$40.05
Governor’s Residence Total	134191	\$3,637	100.0	100.0	\$36.01

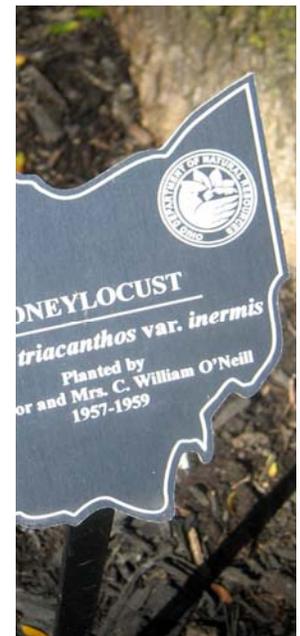


Table 6. Stored CO₂ Benefits of the Governor’s Residence Trees by Species Ordered by Decreasing Benefits

Species	Total stored CO ₂ (lbs)	Total (\$)	% of Total Tree Numbers	% of Total \$	Avg. \$/tree
London planetree	91,611	\$687.08	2.0	19.3	\$343.54
Northern red oak	65,588	\$491.91	6.9	13.8	\$70.27
Honeylocust	41,012	\$307.59	5.0	8.7	\$61.52
Green ash	15,801	\$118.51	3.0	3.3	\$39.50
Sugar maple	70,443	\$528.32	16.8	14.9	\$31.08
White ash	7,344	\$55.08	2.0	1.6	\$27.54
Littleleaf linden	7,190	\$53.93	2.0	1.5	\$26.96
Flowering dogwood	6,756	\$50.67	2.0	1.4	\$25.34
Red maple	18,714	\$140.36	6.9	4.0	\$20.05
Flowering cherries	13,651	\$102.38	7.9	2.9	\$12.80
Flowering crabapple	3,632	\$27.24	4.0	0.8	\$6.81
Apple	1,816	\$13.62	2.0	0.4	\$6.81
Goldenraintree	952	\$7.14	6.9	0.2	\$1.02
Lacebark elm	69	\$0.52	5.0	0.0	\$0.10
Cherry plum	28	\$0.21	2.0	0.0	\$0.10
Other trees	58,812	\$972.44	25.7	27.3	\$37.40
Governor’s Residence Total	474,265	\$3,556.98	100.0	100.0	\$35.22



Table 7. Annual Energy Benefits of Executive Residence Trees by Common Name in Dollars/Tree

Species	Total Electricity (MWh)	Electricity (\$)	Total Natural Gas (Therms)	Natural Gas (\$)	Total (\$)	% of Total Tree Numbers	% of Total \$	Avg. \$/tree
London planetree	0.84	\$64	118.1	\$116	\$180	2.0	5.6	\$89.92
Honeylocust	1.63	\$123	212.8	\$209	\$332	5.0	10.3	\$66.38
Green ash	0.73	\$56	92.1	\$90	\$146	3.0	4.5	\$48.59
White ash	0.54	\$41	56.8	\$56	\$96	2.0	3.0	\$48.12
Sugar maple	3.61	\$274	450.4	\$441	\$715	16.8	22.1	\$42.08
Northern red oak	1.33	\$101	184.3	\$181	\$281	6.9	8.7	\$40.20
Littleleaf linden	0.40	\$30	47.9	\$47	\$77	2.0	2.4	\$38.70
Red maple	1.17	\$88	154.8	\$152	\$240	6.9	7.4	\$34.31
Flowering cherries	0.92	\$70	138.2	\$135	\$205	7.9	6.4	\$25.67
Flowering dogwood	0.20	\$15	32.2	\$32	\$47	2.0	1.5	\$23.50
Flowering crabapple	0.30	\$22	51.3	\$50	\$73	4.0	2.3	\$18.19
Apple	0.15	\$11	25.7	\$25	\$36	2.0	1.1	\$18.19
Goldenraintree	0.15	\$11	19.4	\$19	\$30	6.9	0.9	\$4.34
Cherry plum	0.01	\$1	1.2	\$1	\$2	2.0	0.1	\$0.87
Lacebark elm	0.01	\$1	2.3	\$2	\$3	5.0	0.1	\$0.63
Other trees	3.58	\$272	508.4	\$498	\$770	25.7	23.8	\$29.62
Governor's Residence Total	15.56	\$1,181	2095.7	\$2,054	\$3,235	100.0	100.0	\$32.03

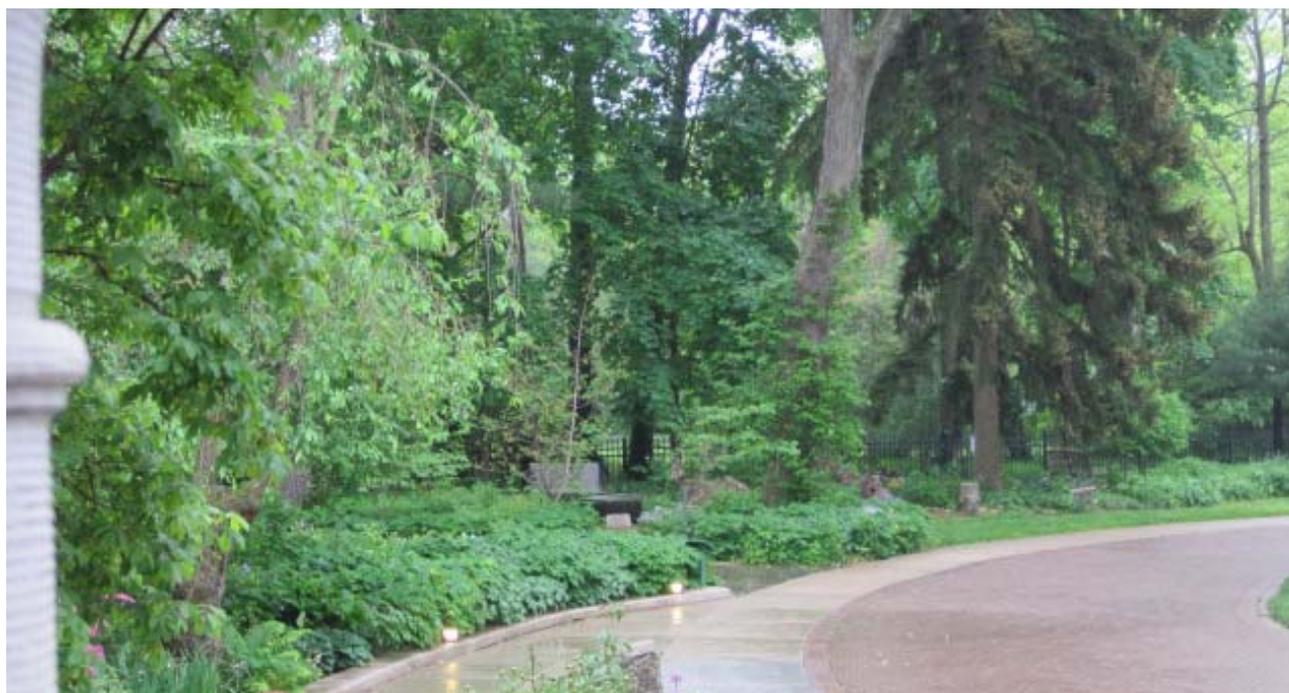


Table 8. Annual Carbon Dioxide Benefits of State Executive Residence Trees by Species Ordered by Decreasing Benefits per Tree

Species	Sequestered (lb)	Sequestered (\$)	Decomposition Release(lb)	Maintenance Release (lb)	Total Release (\$)	Avoided (lb)	Avoided (\$)	Net Total (lb)	Total (\$)	% of Total Tree Numbers	% of Total \$	Avg. \$/tree
London planetree	4535.0	\$34.01	-439.7	-10.9	-\$3.38	1417.0	\$10.63	5501.3	\$41.26	2.0	9.9	\$20.63
Honeylocust	5318.6	\$39.89	-196.9	-12.9	-\$1.57	2725.8	\$20.44	7834.7	\$58.76	5.0	14.2	\$11.75
White ash	987.3	\$7.40	-35.2	-3.9	-\$0.29	897.6	\$6.73	1845.7	\$13.84	2.0	3.3	\$6.92
Green ash	1550.4	\$11.63	-75.8	-6.6	-\$0.62	1227.1	\$9.20	2695.0	\$20.21	3.0	4.9	\$6.74
Littleleaf linden	1028.5	\$7.71	-34.5	-3.9	-\$0.29	673.7	\$5.05	1663.8	\$12.48	2.0	3.0	\$6.24
Sugar maple	5633.5	\$42.25	-338.8	-33.3	-\$2.79	6054.0	\$45.40	11315.3	\$84.86	16.8	20.5	\$4.99
Red maple	2424.3	\$18.18	-89.8	-10.7	-\$0.75	1955.7	\$14.67	4279.5	\$32.10	6.9	7.7	\$4.59
Flowering dogwood	487.1	\$3.65	-32.5	-2.9	-\$0.27	340.4	\$2.55	792.1	\$5.94	2.0	1.4	\$2.97
Northern red oak	803.5	\$6.03	-314.9	-17.4	-\$2.49	2227.6	\$16.71	2698.8	\$20.24	6.9	4.9	\$2.89
Flowering cherries	1372.3	\$10.29	-65.5	-11.7	-\$0.58	1546.2	\$11.60	2841.3	\$21.31	7.9	5.1	\$2.66
Flowering crabapple	455.5	\$3.42	-17.4	-4.7	-\$0.17	496.6	\$3.72	930.0	\$6.97	4.0	1.7	\$1.74
Apple	227.7	\$1.71	-8.7	-2.3	-\$0.08	248.3	\$1.86	465.0	\$3.49	2.0	0.8	\$1.74
Goldenraintree	376.1	\$2.82	-4.6	-3.3	-\$0.06	252.0	\$1.89	620.1	\$4.65	6.9	1.1	\$0.66
Lacebark elm	74.6	\$0.56	-0.6	-1.0	-\$0.01	20.5	\$0.15	93.5	\$0.70	5.0	0.2	\$0.14
Cherry plum	17.4	\$0.13	-0.2	-0.4	\$0.00	11.2	\$0.08	28.0	\$0.21	2.0	0.1	\$0.10
Other trees	6388.4	\$47.91	-622.5	-48.8	-\$5.03	6008.7	\$45.06	11725.9	\$87.94	25.7	21.2	\$3.38
Governor's Residence Total	31680.1	\$237.60	-2277.8	-174.7	-\$18.39	26102.5	\$195.77	55330.0	\$414.98	100.0	100.0	\$4.11



Table 9. Annual Air Quality Benefits of Executive Residence Trees by Species' Common Names and Ordered by Decreasing Benefits per Tree

Species	Deposit O3 (lb)	Deposit NO2 (lb)	Deposit PM10 (lb)	Deposit SO2 (lb)	Total Deposit (\$)	Avoided NO2 (lb)	Avoided PM10 (lb)	Avoided VOC (lb)	Avoided SO2 (lb)	Total Avoided (\$)	BVOC Emission (lb)	BVOC Emission (\$)	Total (lb)	Total (\$)	% Total Tree Numbers	Avg. \$/tree
London planetree	2.3	0.4	1.1	0.1	\$12.35	4.1	0.6	0.6	3.8	\$25.24	-1.9	-\$6.97	11.08	\$30.62	2.0	\$15.31
Honeylocust	3.2	0.5	1.5	0.1	\$17.08	7.7	1.1	1.1	7.4	\$47.93	-2.4	-\$9.14	20.16	\$55.87	5.0	\$11.17
White ash	0.2	0.0	0.1	0.0	\$1.27	2.4	0.4	0.3	2.4	\$15.37	0.0	\$0.00	5.95	\$16.64	2.0	\$8.32
Green ash	0.5	0.1	0.3	0.0	\$2.69	3.4	0.5	0.5	3.3	\$21.50	0.0	\$0.00	8.58	\$24.18	3.0	\$8.06
Sugar maple	2.5	0.4	1.4	0.1	\$13.97	16.8	2.5	2.4	16.4	\$105.82	-2.1	-\$7.92	40.36	\$111.87	16.8	\$6.58
Littleleaf linden	0.3	0.1	0.2	0.0	\$1.77	1.9	0.3	0.3	1.8	\$11.73	-0.2	-\$0.66	4.61	\$12.85	2.0	\$6.42
Red maple	1.6	0.3	0.8	0.1	\$8.81	5.5	0.8	0.8	5.3	\$34.48	-0.6	-\$2.21	14.57	\$41.09	6.9	\$5.87
Northern red oak	3.0	0.5	1.4	0.1	\$15.98	6.4	0.9	0.9	6.0	\$39.54	-4.3	-\$16.04	14.95	\$39.48	6.9	\$5.64
Flowering dogwood	0.4	0.1	0.2	0.0	\$2.28	1.0	0.1	0.1	0.9	\$6.18	0.0	-\$0.01	2.93	\$8.45	2.0	\$4.23
Flowering cherries	0.8	0.1	0.4	0.0	\$4.59	4.5	0.6	0.6	4.2	\$27.82	0.0	-\$0.02	11.40	\$32.39	7.9	\$4.05
Flowering crabapple	0.2	0.0	0.1	0.0	\$1.03	1.5	0.2	0.2	1.3	\$9.16	0.0	\$0.00	3.59	\$10.18	4.0	\$2.55
Apple	0.1	0.0	0.1	0.0	\$0.51	0.8	0.1	0.1	0.7	\$4.58	0.0	\$0.00	1.79	\$5.09	2.0	\$2.55
Goldenraintree	0.0	0.0	0.0	0.0	\$0.11	0.7	0.1	0.1	0.7	\$4.41	0.0	\$0.00	1.62	\$4.52	6.9	\$0.65
Cherry plum	0.0	0.0	0.0	0.0	\$0.00	0.0	0.0	0.0	0.0	\$0.21	0.0	\$0.00	0.08	\$0.21	2.0	\$0.11
Lacebark elm	0.0	0.0	0.0	0.0	\$0.00	0.1	0.0	0.0	0.1	\$0.38	0.0	\$0.00	0.14	\$0.39	5.0	\$0.08
Other trees	6.5	1.2	3.7	0.4	\$37.00	17.3	2.5	2.4	16.2	\$107.09	-10.1	-\$37.94	40.03	\$106.16	25.7	\$4.08
Governor's Residence Total	21.8	3.7	11.3	1.1	\$119.45	73.9	10.8	10.3	70.5	\$461.45	-21.6	-\$80.90	181.83	\$499.99	100.0	\$4.95



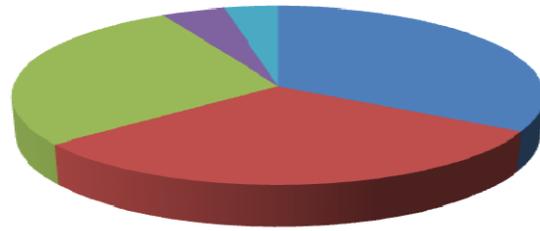
Table 10. Annual Aesthetic or Other Benefits of Governor's Residence with Trees by Species

Species	Total (\$)	% of Total Tree Numbers	% of Total \$	Avg. \$/tree
Honeylocust	\$1,270	5.0	32.8	\$253.94
London planetree	\$274	2.0	7.1	\$136.89
White ash	\$127	2.0	3.3	\$63.74
Littleleaf linden	\$110	2.0	2.9	\$55.09
Green ash	\$149	3.0	3.9	\$49.80
Red maple	\$338	6.9	8.7	\$48.24
Sugar maple	\$680	16.8	17.6	\$39.98
Flowering dogwood	\$29	2.0	0.8	\$14.42
Goldenraintree	\$84	6.9	2.2	\$12.03
Lacebark elm	\$57	5.0	1.5	\$11.42
Flowering cherries	\$78	7.9	2.0	\$9.81
Northern red oak	\$66	6.9	1.7	\$9.39
Flowering crabapple	\$26	4.0	0.7	\$6.40
Apple	\$13	2.0	0.3	\$6.40
Cherry plum	\$0	2.0	0.0	\$0.03
Other trees	\$566	25.7	14.7	\$21.78
Governor's Residence Total	\$3,867	100.0	100.0	\$38.29



Table 11 Environmental Benefits from Five Benefit Categories for the Ohio Governor’s Residence and Heritage Garden Trees

Benefits	Total (\$)	\$/tree
Aesthetic/Other	\$3,867	\$38.29
Stormwater	\$3,637	\$36.01
Energy	\$3,235	\$32.03
Air Quality	\$500	\$4.95
CO2	\$415	\$4.11
Total Benefits	\$11,654	\$115.39



- Aesthetic/Other
- Stormwater
- Energy
- Air Quality
- CO2

