

Annual Air Quality Benefits of Public Trees by Species

7/2/2013

Species	Deposition (lb)				Total Depos. (\$)	Avoided (lb)				Total Avoided (\$)	BVOC Emissions (lb)	BVOC Emissions (\$)	Total (lb)	Total (\$) Standard Error	% of Total Trees	Avg. \$/tree
	O ₃	NO ₂	PM ₁₀	SO ₂		NO ₂	PM ₁₀	VOC	SO ₂							
Narrowleaf cottonwood	830.0	205.0	206.3	89.4	3,055	577.9	123.1	115.5	719.4	2,668	0.0	0	2,866.6	5,723 (N/A)	32.8	3.52
Quaking aspen	31.2	7.6	10.2	3.5	116	129.0	26.0	24.3	147.8	578	-83.4	-218	296.1	476 (N/A)	19.6	0.49
Blue spruce	61.6	15.4	17.3	7.7	229	84.9	17.1	15.9	96.9	380	-404.7	-1,056	-87.9	-447 (N/A)	14.0	-0.64
Crabapple	11.8	2.9	3.6	1.5	44	11.6	2.3	2.2	13.1	52	-0.2	-1	48.7	95 (N/A)	6.0	0.32
Green ash	5.5	1.4	1.7	0.6	21	17.8	3.7	3.4	21.0	80	0.0	0	55.0	101 (N/A)	4.8	0.42
Norway maple	5.5	1.3	1.8	0.6	20	26.3	5.3	4.9	30.1	118	-17.5	-46	58.5	93 (N/A)	4.8	0.39
Pine	11.3	2.8	3.2	1.4	42	11.0	2.3	2.1	13.0	50	-37.0	-97	10.1	-5 (N/A)	3.0	-0.03
Maple	0.5	0.1	0.2	0.1	2	4.8	1.0	0.9	5.5	22	0.0	0	13.1	23 (N/A)	2.8	0.17
White ash	0.2	0.0	0.1	0.0	1	4.4	0.9	0.8	4.9	20	0.0	0	11.4	20 (N/A)	1.9	0.21
Silver maple	17.2	4.3	4.8	1.8	64	31.8	6.6	6.2	38.1	145	-24.8	-65	86.0	144 (N/A)	1.7	1.69
Spruce	6.6	1.6	1.8	0.8	24	8.5	1.7	1.6	9.8	38	-39.9	-104	-7.4	-41 (N/A)	1.2	-0.72
OTHER STREET TREES	32.9	8.2	8.6	3.7	122	31.2	6.5	6.1	37.3	142	-49.2	-128	85.2	135 (N/A)	7.3	0.37
Citywide total	1,014.3	250.7	259.5	111.1	3,740	939.2	196.4	183.9	1,136.9	4,292	-656.7	-1,714	3,435.2	6,318 (N/A)	100.0	1.27

Aspen

Stored CO2 Benefits of Public Trees by Species

7/2/2013

Species	Total Stored CO2 (lbs)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Narrowleaf cottonwo	12,217,179	91,629	(N/A)	32.8	79.0	56.39
Quaking aspen	891,430	6,686	(N/A)	19.7	5.8	6.86
Blue spruce	1,009,109	7,568	(N/A)	14.0	6.5	10.92
Crabapple	114,490	859	(N/A)	6.0	0.7	2.89
Green ash	107,218	804	(N/A)	4.8	0.7	3.35
Norway maple	173,920	1,304	(N/A)	4.8	1.1	5.48
Pine	60,274	452	(N/A)	3.0	0.4	3.03
Maple	17,580	132	(N/A)	2.8	0.1	0.94
White ash	9,751	73	(N/A)	1.9	0.1	0.77
Silver maple	313,362	2,350	(N/A)	1.7	2.0	27.65
Spruce	99,451	746	(N/A)	1.2	0.6	12.86
OTHER STREET TR	203,074	3,358	(N/A)	7.3	2.9	9.25
Citywide total	15,461,464	115,961	(N/A)	100.0	100.0	23.39

The value of stored carbon dioxide is calculated as the total amount of carbon dioxide sequestered annually over the life of each tree, summed for the population. This value should not be added to the Replacement Value or double-counting of the carbon dioxide storage benefit will occur.

Aspen

Annual CO Benefits of Public Trees by Species

7/2/2013

Species	Sequestered (lb)	Sequestered (\$)	Decomposition Release (lb)	Maintenance Release (lb)	Total Released (\$)	Avoided (lb)	Avoided (\$)	Net Total (lb)	Total Standard (\$ Error)	% of Total Trees	% of Total \$	Avg. \$/tree
Narrowleaf cottonwood	413,709	3,103	-58,650	-21,375	-600	527,384	3,955	861,069	6,458 (N/A)	32.8	60.1	3.97
Quaking aspen	102,027	765	-4,295	-5,596	-74	108,580	814	200,716	1,505 (N/A)	19.7	14.0	1.55
Blue spruce	71,483	536	-4,851	-5,439	-77	71,534	537	132,727	995 (N/A)	14.0	9.3	1.44
Crabapple	15,814	119	-559	-1,194	-13	9,773	73	23,835	179 (N/A)	6.0	1.7	0.60
Green ash	15,378	115	-524	-883	-11	15,653	117	29,624	222 (N/A)	4.8	2.1	0.93
Norway maple	21,396	160	-844	-1,182	-15	22,181	166	41,551	312 (N/A)	4.8	2.9	1.31
Pine	6,274	47	-290	-962	-9	9,876	74	14,898	112 (N/A)	3.0	1.0	0.75
Maple	4,358	33	-93	-301	-3	4,464	33	8,428	63 (N/A)	2.8	0.6	0.45
White ash	2,876	22	-53	-196	-2	3,631	27	6,257	47 (N/A)	1.9	0.4	0.49
Silver maple	27,499	206	-1,504	-924	-18	28,013	210	53,084	398 (N/A)	1.7	3.7	4.68
Spruce	6,585	49	-478	-506	-7	7,219	54	12,820	96 (N/A)	1.2	0.9	1.66
OTHER STREET TREES	22,690	170	-2,165	-1,698	-29	27,920	209	46,747	351 (N/A)	7.3	3.3	0.97
Citywide total	710,090	5,326	-74,306	-40,256	-859	836,228	6,272	1,431,756	10,738 (N/A)	100.0	100.0	2.17

Aspen

Annual Energy Benefits of Public Trees By Species

7/2/2013

Species	Total Electricity (MWh)	Electricity (\$)	Total Natural Gas (Therms)	Natural Gas (\$)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Narrowleaf cottonwood	238.7	15,179	20,664.7	18,735	33,914	(N/A)	32.8	58.7	20.87
Quaking aspen	49.1	3,125	6,045.1	5,480	8,606	(N/A)	19.7	14.9	8.84
Blue spruce	32.4	2,059	3,984.1	3,612	5,671	(N/A)	14.0	9.8	8.18
Crabapple	4.4	281	554.6	503	784	(N/A)	6.0	1.4	2.64
Green ash	7.1	451	775.3	703	1,153	(N/A)	4.8	2.0	4.81
Norway maple	10.0	638	1,244.7	1,128	1,767	(N/A)	4.8	3.1	7.42
Pine	4.5	284	506.8	459	744	(N/A)	3.0	1.3	4.99
Maple	2.0	128	222.3	202	330	(N/A)	2.8	0.6	2.36
White ash	1.6	104	222.7	202	306	(N/A)	1.9	0.5	3.22
Silver maple	12.7	806	1,285.4	1,165	1,972	(N/A)	1.7	3.4	23.19
Spruce	3.3	208	387.1	351	559	(N/A)	1.2	1.0	9.63
OTHER STREET TREES	12.6	804	1,293.5	1,173	1,976	(N/A)	7.3	3.4	5.44
Citywide total	378.4	24,068	37,186.2	33,713	57,781	(N/A)	100.0	100.0	11.66

Annual Stormwater Benefits of Public Trees by Species

7/2/2013

Species	Total rainfall interception (Gal)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Narrowleaf cottonwood	3,321,604	35,876	(N/A)	32.8	53.5	22.08
Quaking aspen	655,083	7,075	(N/A)	19.7	10.6	7.26
Blue spruce	1,217,349	13,148	(N/A)	14.0	19.6	18.97
Crabapple	36,819	398	(N/A)	6.0	0.6	1.34
Green ash	91,214	985	(N/A)	4.8	1.5	4.10
Norway maple	133,781	1,445	(N/A)	4.8	2.2	6.07
Pine	165,771	1,790	(N/A)	3.0	2.7	12.02
Maple	21,358	231	(N/A)	2.8	0.3	1.65
White ash	17,267	187	(N/A)	1.9	0.3	1.96
Silver maple	153,482	1,658	(N/A)	1.7	2.5	19.50
Spruce	119,929	1,295	(N/A)	1.2	1.9	22.33
OTHER STREET TREES	274,032	2,960	(N/A)	7.3	4.4	8.15
Citywide total	6,207,688	67,048	(N/A)	100.0	100.0	13.53