

The analysis summary contained in the factsheets and attached guidelines were conducted by the Wisconsin DNR utilizing the i-Tree Streets & Canopy software. The guidelines and analysis include information about the City of Green Bay and other Wisconsin communities urban forest. The information contained herein does not create any Wisconsin DNR policy or guidance. Factsheets may be modified for the user's own purpose. Each user should utilize the factsheets based on its individual circumstance and is responsible for having the appropriate software and operating the program as directed by the manufacturer. Wisconsin DNR will not provide technical support.

Factsheets were created in Adobe Creative Suite CS5.

The following document directs where the figures in the iTree Streets factsheet originate from within the iTree reports. All references to a tab name, reference to the tabs from the excel spreadsheet reports that can be exported from iTree.

City of Green Bay

Street Tree Benefits

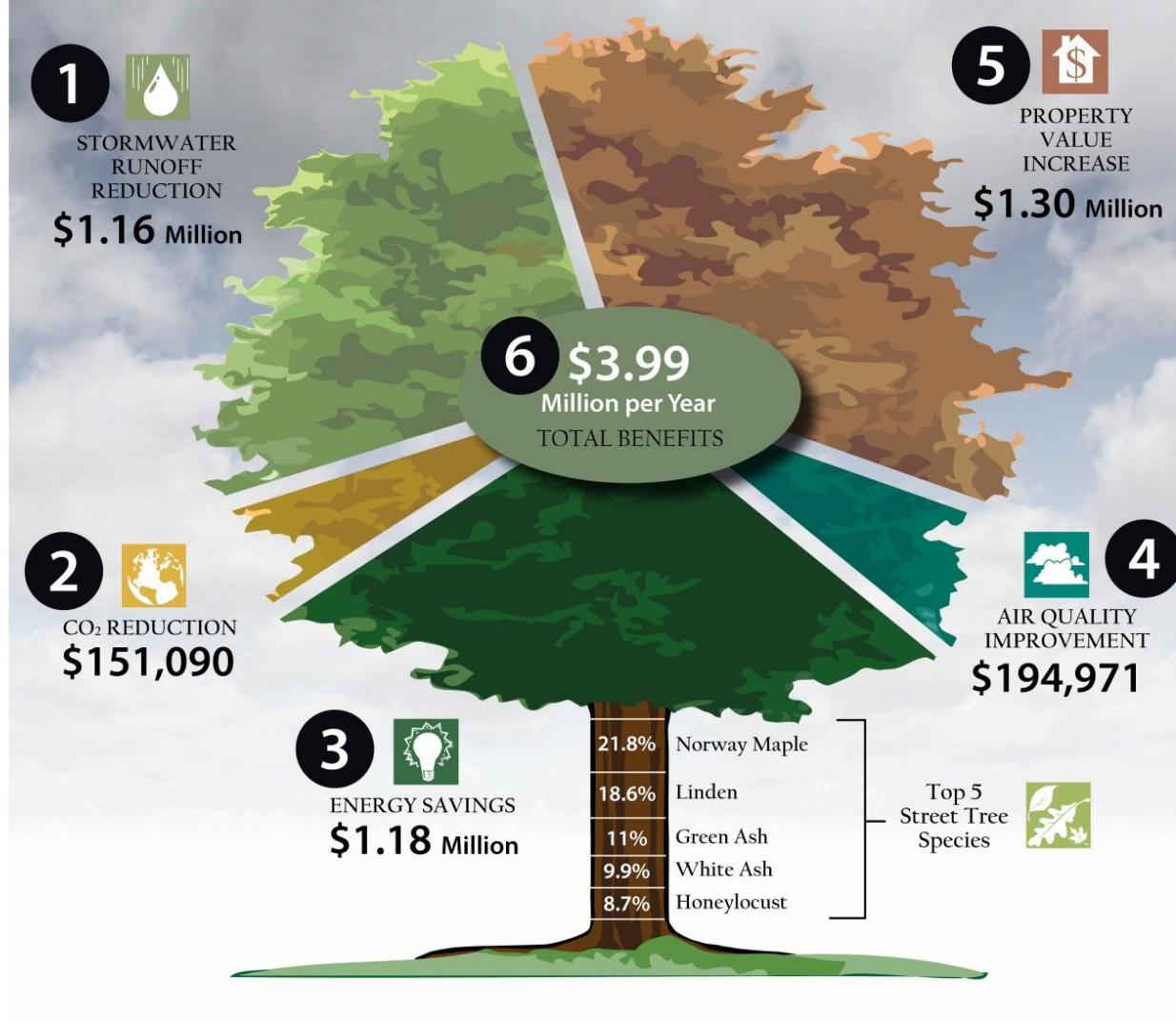


Green Bay street trees provide millions of dollars of environmental, economic and aesthetic benefits to the community. Over their lifetime, street tree benefits exceed the costs of planting and care, representing a 300 percent return on investment. Tree benefits increase over time highlighting the importance of not only planting trees, but of providing ongoing maintenance and protection. These benefits are a reminder of the worthwhile investment in our community forestry program.

Trees:

- Reduce stormwater runoff
- Lower summer air temperatures
- Reduce air pollution
- Reduce heating and cooling costs
- Reduce atmospheric carbon dioxide (CO₂)
- Enhance property values
- Provide wildlife habitat
- Improve health and wellbeing
- Improve learning and concentration
- Provide aesthetic benefits

Annually **Green Bay** public street trees provide¹...





Trees Reduce Stormwater Runoff and Improve Water Quality

Trees reduce peak stormwater runoff and associated pollutants entering local water bodies. Trees reduce stormwater volumes by intercepting a portion of rainfall, which evaporates and never reaches the ground. Tree roots also increase rainfall infiltration and storage in the soil. And tree canopies reduce soil erosion by diminishing the impact of raindrops on barren surfaces.

Street trees in Green Bay intercept 42,7625 gallons of water annually for a savings of \$18,709.



Trees Reduce Atmospheric Carbon Dioxide

Trees reduce atmospheric carbon by capturing and storing CO₂ as they grow. By reducing demand for heating and cooling, trees indirectly reduce CO₂ by avoiding power plant emissions associated with energy production.

Street trees in Green Bay capture 5,94 tons of atmospheric CO₂ per year. Annual savings including indirect costs are \$15,1090. Street trees also store approximately 5,115 tons of atmospheric CO₂ for a total savings of \$12,878.



Trees Improve Air Quality

Trees improve air quality by trapping particulates, absorbing gaseous pollutants, and releasing oxygen. By cooling urban heat islands and shading parked cars, trees indirectly reduce ozone levels. The Environmental Protection Agency recognizes tree planting as an ozone reduction measure in state implementation plans.

Street trees in Green Bay remove 1,130 lbs. of particulate matter, 5,14 lbs. of ozone, 1,15 lbs. of sulfur dioxide and 1,16 lbs. of nitrogen oxides annually. Total annual savings including indirect cost are \$1,17,71.



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Trees Save Energy

Trees reduce the demand for energy to heat and cool buildings by providing shade, lowering summertime temperatures, and reducing windspeeds. Secondary benefits are reduced water consumption and pollutants emissions by local power plants.

Street trees in Green Bay save approximately 1,189 MWH of electricity and 7,1949 Therms of natural gas annually for a savings of \$1,12074.



Trees Improve Property Values and Beautify Our Communities

Trees are the single strongest positive influence on scenic quality in our community! They increase the attractiveness of retail business areas. Studies found shoppers are willing to pay up to 11% more for goods and services in a well-landscaped business district. Trees increase property values. People will pay 3-7% more for properties with many trees. Trees foster safer and more sociable neighborhoods. Views of trees ease mental fatigue and stress, help concentration, reduce sickness, and provide settings for recreation and relaxation. Trees also help reduce noise, provide a refuge for wildlife, and help connect residents with their natural environment.

Street trees in Green Bay increase property values annually by \$1,32115.



Diversity Improves Urban Forest Resilience

A diverse palette of trees helps guard against catastrophic loss to insects and diseases or environmental stresses. A general guideline for urban forest diversity is no more than 5% of any one species, 10% of any one genus.

Maple, a 22 and linden trees are over-represented on Green Bay's streets. This jeopardizes \$3,02396 of the city's urban forest's benefits from pests such as emerald ash borer (EAB) and Asian longhorned beetle (ALB). Enlist the public to help increase Green Bay's urban forest resilience by planting less common trees on their own property.

¹Analysis was conducted using iTree Streets. iTree Streets is a street tree management and analysis tool for urban forest managers that uses tree inventory data to quantify the dollar value of annual environmental and aesthetic benefits. The iTree Suite is a free state-of-the-art, peer-reviewed software suite from the USDA Forest Service. www.itreetool.org.

Tree graphic concept courtesy of City of New York Department of Parks & Recreation.

"NetAnnualStormwaterAll" Tab (Benefits-Cost Analysis Reports)

Annual Stormwater Benefits of All Trees by Species						
Species	Total Rainfall Interception (Gal)	Total (\$)	Standard Error	% of Total Tree Numbers	% of Total \$	Avg. \$/tree
Norway maple	11,273,978.92	305,546.07	(N/A)	21.80	26.32	41.91
Basswood	9,368,454.86	253,902.78	(N/A)	18.57	21.87	40.87
Green ash	4,936,323.49	133,783.67	(N/A)	11.82	11.53	33.84
White ash	3,647,178.34	98,845.40	(N/A)	9.85	8.52	30.01
Honeylocust	3,880,108.11	105,158.24	(N/A)	8.73	9.06	36.03
Northern red oak	699,392.21	18,954.85	(N/A)	2.28	1.63	24.81
Silver maple	1,943,011.94	52,659.28	(N/A)	2.05	4.54	76.76
Sugar maple	1,014,156.20	27,485.54	(N/A)	1.99	2.37	41.39
Bur oak	318,620.87	8,635.23	(N/A)	1.86	0.74	13.91
Freeman Maple Cultivar	254,519.20	6,897.95	(N/A)	1.79	0.59	11.52
Ginkgo	200,329.32	5,429.30	(N/A)	1.62	0.47	10.02
Red maple	728,426.79	19,741.74	(N/A)	1.61	1.70	36.69
Crabapple species	168,846.63	4,576.06	(N/A)	1.45	0.39	9.45
Kentucky coffeetree	271,100.94	7,347.35	(N/A)	1.35	0.63	16.22
Maple	614,167.02	16,645.08	(N/A)	1.20	1.43	41.30
Shangtung Maple Hybrid	145,206.12	3,935.36	(N/A)	1.12	0.34	10.49
OTHER STREET TREES	3,363,803.91	91,165.42	(N/A)	10.92	7.85	24.96
CITYWIDE TOTAL	42,827,624.86	1,160,709.32	(N/A)	100.00	100.00	34.70

**7 8
Annual Stormwater Benefits of All Trees by Zone**

Zone	Total rainfall interception(Gal)	Total (\$)	Standard Error	% of Total Tree Numbers	% of Total \$	Avg. \$/tree
1	42,827,624.86	1,160,709.32	(N/A)	100.00	100.00	34.70
Citywide total	42,827,624.86	1,160,709.32	(N/A)	100.00	100.00	34.70

"NetAnnualPropertyAll" tab (Benefits-Cost Analysis Reports)

Annual Aesthetic/Other Benefit of All Trees by Species					
Species	Total (\$)	Standard Error	% of Total Tree Numbers	% of Total \$	Avg. \$/tree
Norway maple	247,540.36	(N/A)	21.80	19.03	33.95
Basswood	262,398.52	(N/A)	18.57	20.17	42.24
Green ash	149,683.61	(N/A)	11.82	11.51	37.87
White ash	141,541.92	(N/A)	9.85	10.88	42.97
Honeylocust	238,276.35	(N/A)	8.73	18.32	81.63
Northern red oak	12,972.81	(N/A)	2.28	1.00	16.98
Silver maple	49,461.08	(N/A)	2.05	3.80	72.10
Sugar maple	26,220.35	(N/A)	1.99	2.02	39.49
Bur oak	12,907.29	(N/A)	1.86	0.99	20.78
Freeman Maple Cultivar	10,812.23	(N/A)	1.79	0.83	18.05
Ginkgo	3,346.09	(N/A)	1.62	0.26	6.17
Red maple	28,388.31	(N/A)	1.61	2.18	52.77
Crabapple species	3,830.99	(N/A)	1.45	0.29	7.92
Kentucky coffeetree	9,541.01	(N/A)	1.35	0.73	21.06
Maple	21,797.46	(N/A)	1.20	1.68	54.09
Shantung Maple Hybrid	4,976.77	(N/A)	1.12	0.38	13.27
OTHER STREET TREES	77,020.13	(N/A)	10.92	5.92	21.09
CITYWIDE TOTAL	1,300,715.28	(N/A)	100.00	100.00	38.89

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Annual Aesthetic/Other Benefit of All Trees by Zone

Zone	Total (\$)	Standard Error	% of Total Tree Numbers	% of Total \$	Avg \$/tree
1	1,300,715.28	(N/A)	100.00	100.00	38.89
Citywide total	1,300,715.28	(N/A)	100.00	100.00	38.89

“SpeciesCompositionAll” tab (Resource Structural Analysis Reports)

Species Distribution of All Trees (%)	
01/18/2012	
Species	Percent
Norway maple	21.80
Basswood	18.57
Green ash	11.82
White ash	9.85
Honeylocust	8.73
Northern red oak	2.28
Silver maple	2.05
Sugar maple	1.99
Bur oak	1.86
Freeman Maple Cultivar	1.79
OTHER SPECIES	19.27
Total	100.00

- 22 Species to list is figured using this table. Need to determine what combination of species are more than the recommended 10% for Genera.
- 23 Use table in “AverageAnnualBenefitsAll” to figure the total benefits of all the species listed in the Genera for #22.