

Indiana's Benefit-Cost Ratio Summary

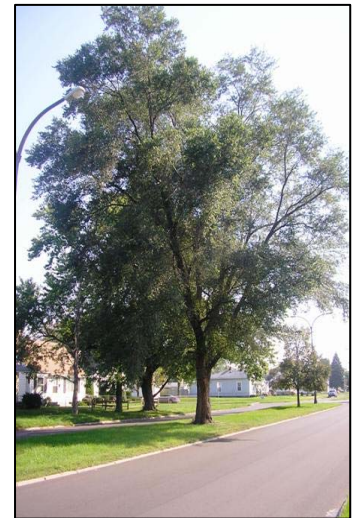
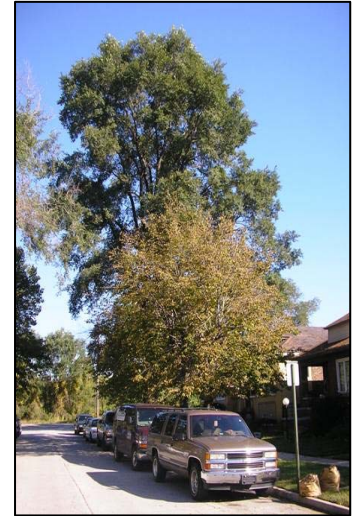
Do the benefits of Indiana's streets trees outweigh the costs involved to plant and maintain them? Is it worth it? YES, communities of all sizes throughout Indiana receive positive returns on their investments in managing street tree populations for health, safety, and public benefit. The Indiana DNR Division of Forestry, Community and Urban Forestry statewide sample inventory project suggests there are substantial economic and environmental benefits generated from Indiana's street tree populations. These benefits include energy conservation, stormwater management, air quality improvements, carbon dioxide sequestration, and increased property values and social community pride.

To prove investment worth, the project applied an urban forestry benefit-cost ratio model to evaluate the net benefits (benefits minus costs) of street tree populations in 23 communities. The results show the ratio of total annual benefits provided by each community's street trees, expressed in monetary terms, compared to the costs associated with their management. Table 1 provides benefit-cost ratios broken into Towns and City class designations (First, Second, and Third Class Cities). Using median values for each community class, the following returns are earned by Indiana communities' urban forestry investment:

- 🌿 *Towns* receive \$1.74 for every dollar invested in street tree management,
- 🌿 *Third Class Cities* receive \$1.17 for every management dollar,
- 🌿 *Second Class Cities* receive \$2.26 per management dollar, and
- 🌿 *First Class Cities* receive \$5.55 for every dollar invested in the street tree population.

These returns demonstrate that smaller communities such as Towns and Third Class Cities typically invest little in the planting and maintenance of their street tree population, and larger communities typically invest more in the planting, pruning, removal, and general maintenance of their street tree population and receive greater overall benefits in return.

The total annual benefits a community receives depends on the extent and canopy size of its street tree population. Street tree canopy cover is influenced by the population's size and overall maturity. Canopy cover is the ultimate factor contributing to the total benefits trees provide. Table 1 illustrates each community's canopy cover and corresponding benefits. To maximize canopy cover, and ultimately maximize urban forest benefits, a community must increase its total tree population, manage its existing street trees to reach full maturity, and focus on planting the largest-growing tree suitable for the site. These basic program objectives will result in an increase of gross benefits that street trees provide to the community. Obviously, proactive street tree management comes at an increased cost to the community. However, if a community's urban forestry program sets a goal to increase canopy cover through new plantings and maintaining existing street trees for health and safety, the end result will be a positive return on that investment year after year. As illustrated in Table 1, the investment in a comprehensive and proactive community forestry program is paid back to the community, as is the case in 18 of the 23 communities. In other words, street trees are worth it!



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Table 1. Total Annual Benefits, Net Benefits, and Costs for Street Trees in Indiana

Community	Canopy Cover from Street Trees (Acres)	Gross Benefits (\$) with Standard Error ¹	Program Costs (\$)	Net Benefit (\$)	Benefit-Cost Ratio (BCR)
Town (Unclassified)					
Fort Branch	7	18,989 (±4,635)	2,350	16,639	8.08
Newburgh	17	53,142 (±12,746)	43,900	9,242	1.21
Brookville	12	36,723 (±5,616)	31,025	5,698	1.18
Upland	14	100,786 (±21,860)	500	100,286	201.57
Cedar Lake	40	283,873 (±74,545)	163,000	120,873	1.74
Median BCR Value	-	-	-	-	1.74
Third Class Cities (Population less than 35,000)					
Washington	52	159,230 (±22,123)	213,400	-54,170	0.75
Madison	31	200,601	17,880	182,721	11.22
Greendale	4	14,428	34,200	-19,772	0.42
Beech Grove	24	84,606 (±16,632)	647,220 ²	-562,614	0.13
Peru	64	450,364 (±67,302)	0	450,364	0.00
Kendallville	55	392,826 (±62,700)	11,507	381,319	34.14
Rushville	28	86,102 (±17,056)	54,000	32,102	1.59
East Chicago	84	540,763 (± 89,830)	179,000	361,763	3.02
Median BCR Value	-	-	-	-	1.17
Second Class Cities (Population 35,000 up to 250,000)					
Anderson	243	737,318 (±73,331)	155,700	581,618	4.74
Bloomington	164	570,111	261,968	308,143	2.18
Evansville	197	562,491	269,965	292,526	2.08
Fort Wayne	801	5,872,011	674,000	5,198,011	8.71
Gary	942	5,684,075 (±413,161)	0	5,684,075	0.00
Lafayette	156	1,102,915 (±107,748)	487,000	615,915	2.26
Mishawaka	122	774,853 (±72,839)	185,000	589,853	4.19
Muncie	245	698,279	645,000	53,279	1.08
South Bend	732	4,497,703 (±265,686)	504,896	3,992,807	8.91
Median BCR Value	-	-	-	-	2.26
First Class Cities (Population 250,000 and over)					
Indianapolis	1,857	6,608,147	1,191,048	5,417,099	5.55

¹ Standard error values are listed where sample tree inventories were performed. Complete tree inventories were used in all other community assessments.

² Repair and mitigation of infrastructure damage accounts for 77 percent of Beech Grove's program costs.

In 2008, Indiana DNR, Division of Forestry, Community and Urban Forestry program commissioned a study to assess the status of the state's urban forest resource via a sample statewide inventory and analysis. The Sample Urban Statewide Inventory project utilized i-Tree's STRATUM application to capture forest resource structure, function, and value in 23 communities across Indiana. The communities used in this project characterize a broad range of locations, populations, and demographics in Indiana. Municipal cost surveys were collected from each participating community to account for municipal expenditures in the management of street tree populations. The combination of street tree inventories, cost surveys, and STRATUM analyses has provided the state of Indiana with scientifically reliable estimations of the net financial return that communities receive from their street tree populations throughout the state.

